

**IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF ILLINOIS  
EASTERN DIVISION**

PRECI-DIP SA,  
a Swiss Corporation,

Plaintiff,

V.

TRI-STAR ELECTRONICS  
INTERNATIONAL, INC.,  
a Delaware Corporation,

Defendant.

Honorable Judge Ronald A. Guzman  
Honorable Magistrate Judge Ashman

Case No. 08-CV-4192

**MEMORANDUM IN SUPPORT OF PLAINTIFF'S MOTION FOR  
A PRELIMINARY INJUNCTION**

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## **I. INTRODUCTION**

Defendant Tri-Star Electronics International, Inc. (“Tri-Star”) filed a baseless and overreaching complaint against Plaintiff, Preci-Dip SA (“Preci-Dip”) for the sole purpose of providing a segue to harass and threaten Preci-Dip’s customers and distributors from purchasing Preci-Dip’s products, which Tri-Star knew did not infringe its patents. Therefore, Preci-Dip seeks a order preliminarily enjoining Tri-Star from issuing further statements, communicating with or otherwise contacting Preci-Dip’s customers, potential customers or its end-users, either orally or in writing, either directly or indirectly, alleging that any of Preci-Dip’s products infringe on any patent owned by Tri-Star, or that Preci-Dip’s Reversed Clip Contact does not meet Military specifications, such as MIL-C-39029.

In January of 2006, Tri-Star began its bad-faith harassment of its competitor, Preci-Dip, by sending a baseless cease and desist letter, accusing Preci-Dip’s Reversed Clip product of infringing one or more unidentified claims in Tri-Star’s Patent, U.S. Pat. No. 6,250,974 (the “’974 Patent”). Preci-Dip conducted an internal investigation and consulted with European and US patent counsels in response to Tri-Star’s letter, and in April 2006 responded to Tri-Star, stating that Preci-Dip concluded that it did not infringe any claim of the ‘974 Patent.

Preci-Dip did not hear from Tri-Star for the remainder of 2006 and for most of 2007, and reasonably assumed that Tri-Star agreed that Preci-Dip did not infringe the ‘974 Patent. Preci-Dip thereafter expanded its production and sales capabilities in reliance on Tri-Star’s silence.

In November 2007, Tri-Star suddenly again accused Preci-Dip of “violating [Tri-Star’s] patent filings,” but again included no explanation of any basis for its claim.

Tri-Star has not confined its attack to Preci-Dip, but has contacted Preci-Dip’s current and potential customers, including Preci-Dip’s distributors, and asserted that Preci-Dip is infringing Tri-Star’s ‘974 Patent and that Preci-Dip’s Reversed Clip Contact does not meet



Military specification MIL-39029, with a wanton disregard for the truth of either statement.

Tri-Star's unabated and unlawful harassment of Preci-Dip and assassination of Preci-Dip's character in the eyes of Preci-Dip's customers is likely to cause, and has indeed already caused, irreparable damage to Preci-Dip's goodwill, reputation and business, and must be stopped.

## **II. BACKGROUND**

### **A. Preci-Dip and its Products**

Preci-Dip is a world leader in the design, manufacture and sale of cutting-edge interconnect components, such as its patented interconnect component that is the subject of this action. Preci-Dip's products are produced in a wide variety of categories for various uses, including various military uses.

Among its many products, Preci-Dip manufactures and sells a MIL (Military) contact with reversed clip under military specification MIL C-39029 (the "Preci-Dip Reversed Clip Contact"). Declaration of Patrick Loviat (the "Loviat Declaration"), attached hereto as Exhibit 1, ¶¶ 1 and 2. A drawing of the Preci-Dip Reverse Clip Contact is attached hereto as Exhibit 2. The Preci-Dip Reversed Clip Contact comprises three main parts: a contact body, a reversed clip, and a hood. The Preci-Dip Reversed Clip Contact was developed in 1997 and is covered by one or more claims of Preci-Dip's U.S. Patent No. 6,264,508, issued on July 24, 2001 (the "'508 Patent"). A copy of the '508 Patent is attached as Exhibit 3. It is clear from both Exhibit 2 and the figures of the '508 Patent shown in Exhibit 3 that Preci-Dip's product is a three piece contact and the steps of manufacturing and using the contact include the steps of supplying a hood to the exposed end of the second piece and over the exposed end of the reverse clip. Preci-Dip sells the Preci-Dip Reversed Clip Contact throughout the world, including the United States, through its distributors and to various customers.

As a result of its dedication to quality products and its world-wide sales, Preci-Dip's name is recognized throughout the world. This recognition, and the exceedingly valuable goodwill associated with Preci-Dip's trade name and products, are among its most valuable assets, and have been developed over the years and at great effort and expense by Preci-Dip.

**B. Tri-Star and the '974 Patent**

Tri-Star is a Delaware corporation and is allegedly the successor by merger of the assignee of the '974 Patent, which is the patent at issue in this matter. A copy of the '974 Patent is attached hereto as Exhibit 4. As seen, the '974 Patent is directed to an electrical socket contact that is "hoodless" and "two-piece," and is appropriately entitled, "Hoodless Electrical Socket Contact." Indeed, the device claims of the '974 Patent require a two piece, hoodless contact, in which one piece is a socket body and the second piece is a separate spring contact. Additionally, the system and method claims require steps involving a two piece female socket contact in which there is no hood; the second piece is inserted entirely within the first piece.

Tri-Star directly, or through its agents, distributors, and affiliates, sells and distributes various hooded electrical socket contacts throughout the United States, including within this District, but apparently does not sell any "hoodless" socket contact covered by the claims of its '974 patent.

**C. Tri-Star's Bad-Faith and Tortious Conduct**

On January 25, 2006, Tri-Star sent a letter to Preci-Dip asserting that "Preci-Dip may be in violation of Tri-Star's reverse clip contact design." A copy of the January 25, 2006 letter is attached hereto as Exhibit 5.

In response to the January 25 letter, Preci-Dip thoroughly investigated Tri-Star's claims of infringement. Through this investigation, Preci-Dip determined that it was not infringing any claim of the '974 Patent. Among the various reasons for noninfringement, Preci-Dip determined

that each claim of the '974 Patent requires a two-piece, "hoodless" contact. This determination was based on a consideration of the claims of the '974 Patent and the various statements to the United States Patent and Trademark Office (the "USPTO") and amendments made by Tri-Star during the prosecution of the '974 Patent.

By way of example, in its April 19, 1999 Response to a USPTO Office Action, attached hereto as Exhibit 6, Tri-Star states, "[the cited reference] discloses nothing remotely similar to Applicant's claimed hoodless contact invention. [The cited reference] instead discloses the standard hooded connector." (emphasis in the original). Ex. 6, p. 5.

Again, in its November 17, 2000 Response to a USPTO Office Action, attached hereto as Exhibit 7, Tri-Star states, "Applicant has developed a two-piece socket contact which [sic] not only meets the relevant military specifications essential for Aerospace and Defense Industry, but provides a significant cost savings to users by eliminating a conventional precision hood with its attendant shortcomings..." (emphasis added). Ex. 7, p. 23.

Indeed, Preci-Dip learned through its investigation that in the first Office Action issued in that prosecution, the USPTO required Tri-Star to amend the title of the application to include the word "hoodless," in order to accurately reflect the nature of the invention. Ex. 6, p. 4.

Moreover, the USPTO Examiner deemed the "hoodless, two-piece" concept inherent and necessary to the viability of the '974 Patent, and was the main reason for allowability. As the Examiner stated in the Notice of Allowability, attached hereto as Exhibit 8, "[t]he primary reason for allowance of the claims is the inclusion of the limitation, the hoodless socket contact is a two-piece contact body having socket body with a forward tubular portion, a rearward tubular portion..." (emphasis in the original). Ex. 8, p. 2.

As seen in Exhibits 2 and 3, and as discussed above, Preci-Dip's '508 Patent and

Reversed Clip products each require a three-piece, hooded contact. This fact is well known throughout the industry, and by all reasonable accounts, is well known to Tri-Star.

Based on the results of its investigation, Preci-Dip responded to Tri-Star's letter on April 26, 2006, stating that Preci-Dip had concluded that its products did not infringe any valid, enforceable claim of Tri-Star's '974 Patent. A copy of the April 26, 2006 letter is attached hereto as Exhibit 9.

When Preci-Dip did not receive any response to its April 26, 2006 letter, Preci-Dip proceeded with its business, investing substantial money, time and effort in expanding its products and sales, all while operating under the assumption that Tri-star agreed with Preci-Dip's conclusion of noninfringement. However, nineteen (19) months later, on November 14, 2007, Tri-Star sent another letter to Preci-Dip, once again vaguely accusing Preci-Dip's Reversed Clip contact of "violating [Tri-Star's] patent filings," without any explanation whatsoever of the merits of Tri-Star's unfounded claims. A copy of the November 14, 2007 letter is attached hereto as Exhibit 10. Based on the specious nature of Tri-Star's claims, Preci-Dip did not believe that it was necessary to respond to the November 14, 2007 letter.

However, in late June 2008, Preci-Dip learned from a customer that Tri-Star had been circulating a complaint it had apparently filed against Preci-Dip in the Central District of California (the "Tri-Star Complaint"), accusing Preci-Dip's Reversed Clip contact of infringing the '974 Patent. Loviat Decl., ¶ 3. The Tri-Star complaint is captioned as Civil Action 2:08-cv-04226-GAF-AJW in the Central District of California. Tri-Star has never properly served this complaint on Preci-Dip, a Swiss corporation, and based on the docket in the California case, attached hereto as Exhibit 11, has never attempted to obtain Letters Rogatory or initiate the steps necessary to properly serve Preci-Dip under the Hague Convention on Service of Process. Preci-

Dip subsequently learned that Tri-Star circulated its Complaint to numerous entities in the industry, including Preci-Dip's current and potential customers. Loviat Decl., ¶ 3.

In fact, along with the Complaint that Tri-Star circulated to Preci-Dip's customers and distributors, Tri-Star sent a letter informing them of the Tri-Star Complaint and Tri-Star's baseless claims that Preci-Dip's Reversed Clip Contact infringes the '974 patent. A copy of one of the customer letters is attached as Exhibit 12.

Moreover, Tri-Star officers then intentionally called some of these same Preci-Dip customers to, among other things, threaten and coerce them to not buy or sell Preci-Dip's Reversed Clip Contact. Indeed, at least one Preci-Dip customer, who also distributes Tri-Star products, understood that if it continued to carry Preci-Dip products, Tri-Star would terminate its relationship with the customer. The customer has refused to ship Preci-Dip contacts it had purchased because of these unwarranted threats. Loviat Decl., ¶¶ 7 – 13.

It became clear to Preci-Dip that Tri-Star had filed its baseless Complaint – with no intention of serving it – as a sham to use in threatening Preci-Dip's customers and distributors. Faced with no other choice, Preci-Dip was forced to bring the present Declaratory Judgment Action, seeking a Declaration that the '974 Patent is invalid, void and unenforceable, and that Preci-Dip and Preci-Dip's products do not infringe, and have not infringed, any valid claim of the '974 Patent. Additionally, because of Tri-Star's bad-faith actions, Preci-Dip brought claims of Federal unfair competition, violation of the Illinois Deceptive Trade Practices Act, violation of the Illinois Consumer Fraud and Deceptive Business Practices Act, common law unfair competition, and tortious interference with business relationships and with prospective business advantages.

**III. TRI-STAR SHOULD BE PRELIMINARILY ENJOINED FROM CONTACTING ANY CURRENT OR POTENTIAL CUSTOMER OF PRECI-DIP, OR ANY CURRENT OR POTENTIAL END-USER OF PRECI-DIP'S PRODUCTS.**

**A. The Standard for Issuance of a Temporary Restraining Order**

A temporary restraining order is proper where, as here, the movant establishes that: (1) its case has a "better than negligible" likelihood of success on the merits; (2) that no adequate remedy at law exists; and (3) that it will suffer irreparable harm if the injunction is not granted. *See Ty, Inc. v. Jones Group Inc.*, 237 F.3d 891 (7th Cir. 2001) (listing the showing required to obtain a preliminary injunction); *Bernina of Am., Inc. v. Fashion Fabrics Int'l, Inc.*, 57 U.S.P.Q.2d 1881, 1882 (N.D. Ill. 2001) (granting a temporary restraining order for trademark infringement and noting that the standards for a temporary restraining order are the same as those for a preliminary injunction). Once these conditions have been met, the court considers the public interest in granting or denying the injunction. *Ty, Inc.*, 237 F.3d at 895.

While patent rights are protected under federal law, and the Federal Circuit will have appellate review regarding this Motion, *see, e.g., Mikohn Gaming Corp. v. Acres Gaming, Inc.*, 165 F.3d 891, 894 (Fed. Cir. 1998), the Federal Circuit has generally viewed the grant of a preliminary injunction as a matter of procedural law, and, as such, applies the procedural law of the regional circuit in which the case was brought – in this case, the Seventh Circuit. *Id.* While the Federal Circuit will give deference to the regional Circuit's precedent, the Federal Circuit will give dominant effect to its own precedent insofar as it reflects considerations specific to patent issues. *Id.*

Preci-Dip more than exceeds the level of proof required to establish a likelihood of success on the merits. Not only do the facts of this case strongly support a finding by this Court that Preci-Dip will succeed on the merits of its claims, they also demonstrate that Preci-Dip has no adequate remedy at law and will suffer irreparable injury to its reputation and goodwill if the

injunction is not granted. Finally, a balancing of the parties' respective harms supports entry of a preliminary injunction.

**B. Preci-Dip Will Succeed on the Merits of Its Claims**

In order to demonstrate a likelihood of success on the merits for purposes of preliminary relief, Preci-Dip need only demonstrate that its chance of prevailing on its claims of non-infringement, unfair competition and tortious interference with business relationships is "better than negligible." *Kinney v. International Union of Operating Engineers*, 994 F.2d 1271, 1275 (7<sup>th</sup> Cir. 1993). As explained below, Preci-Dip's likelihood of prevailing on its claims is strong - far better than negligible -- and, therefore, this Court should grant the preliminary injunction.

1. *Preci-Dip's products do not infringe the '974 Patent.*

Preci-Dip's Complaint requests a declaration that Preci-Dip's products do not infringe the '974 Patent. As shown below, Preci-Dip is likely to succeed on the merits of this claim.

In assessing the likelihood of success on the merits of these counts, a court considers the likelihood of infringement, applying the two-step process of determining the scope and meaning of the patent claims asserted and comparing them to the allegedly infringing device. *See, e.g., Oakley, Inc. v. Sunglass Hut Intern.*, 316 F.3d 1331, 1339-1340 (Fed. Cir. 2003). Finally, although the principles of claim-by-claim analysis and of construction-before-comparison-to-prior-art apply in the context of a preliminary injunction as well as at trial, an accused infringer's burden of proof is notably different in the two contexts. Specifically, the accused infringer's burden is not as extensive in the context of a preliminary injunction, and the accused infringer need not show that a patentee cannot overcome the accused infringer's potential defenses. *See, e.g., National Steel Car, Ltd. v. Canadian Pacific Ry., Ltd.*, 357 F.3d 1319, 1334 (Fed. Cir. 2004) (vacating a preliminary injunction enjoining infringement because the district court erred in finding that the patentee showed a likelihood of success in overcoming the accused infringer's

defenses).

A claim chart outlining each element of the independent claims is attached hereto as Exhibit 13. This claim chart comprises the elements of the independent claims with the elements of the Preci-Dip Reversed Clip Contact shown in Exhibit 3. As seen, using the plain meaning of each term in the independent claims '974 Patent, and without even reaching the question of whether the '974 Patent is valid, Preci-Dip can demonstrate that its chance of prevailing is "better than negligible" because each independent product and method claim in the '974 Patent (i.e., claims 1, 8, 13 and 17) requires a "hoodless," "two-piece" contact. For example, claim 1 is directed to "a hoodless contact...." Claim 8 is directed to "[a] two piece female contact" (emphasis added) and requires, among other elements, "...a separate male contact engaging spring forming another piece of the female contact, the spring being entirely seated in the first bore." The requirement in claim 8 that the spring be 'entirely' seated in the first bore was added in the parent application as an amendment, limiting the location of the spring to within the bore. This is obviously the functional equivalent of a "hoodless," or "two-piece," contact. Moreover, as noted above, besides the addition of these claim limitations, Tri-Star continually and consistently argued to the USPTO that its "hoodless" contact was distinguishable from prior patents directed to hooded contacts. Such representations to the USPTO were intended to secure patentability, and are binding on Tri-Star under the established doctrine of prosecution history estoppel. *See, e.g., Ekchian v. Home Depot, Inc.*, 104 F.3d 1299, 1304 (Fed. Cir. 1997); *Springs Window Fashions L.P. v. Novo Indus., L.P.*, 323 F.3d 989, 995 (Fed. Cir. 2003).

As seen in Exhibits 2 and 3, Preci-Dip's accused product is a hooded contact, and is not "hoodless." As such, it clearly falls outside the scope of the '974 Patent. Notwithstanding the fact that the prosecution history clearly shows that Preci-Dip's products do not fall within the



scope of the claims of the '974 Patent, a simple reading of the claims of the '974 Patent, using the plain meaning of the claim terms, also shows that Preci-Dip's chances of success on the merits are "better than negligible."

2. *Tri-Star's communications were made in bad faith.*

Counts 3 through 7 of Preci-Dip's Complaint relate to Tri-Star's bad-faith communications. Specifically, Preci-Dip has alleged Federal unfair competition, violation of the Illinois Deceptive Trade Practices Act, violation of the Illinois Consumer Fraud and Deceptive Business Practices Act, common law unfair competition, and tortious interference with business relationships and with prospective business advantages. These remaining allegations are based primarily on two main courses of action taken by Tri-Star. As seen below, Preci-Dip is likely to succeed on its merits by alleging either, let alone both, course of action taken by Tri-Star.

a. *Tri-Star's allegations of Infringement were made in bad faith.*

The first bad-faith course of action taken by Tri-Star is the letters it sent to Preci-Dip's current and prospective customers, baselessly alleging infringement of the '974 Patent.

In order to determine whether to prevent Tri-Star from continuing with its bad-faith communications under the guise of 'giving notice of Tri-Star's patent rights,' this Court must "apply federal patent law and precedent relating to the giving of notice of patent rights...[and determine] whether, under applicable federal law, the notice of patent rights was properly given." *GP Industries, Inc. v. Eran Industries, Inc.*, 500 F.3d 1369, 1373 (Fed. Cir. 2007) (quoting *Mikohn Gaming*, 165 F.3d at 898).

According to Federal Circuit precedent, Tri-Star's notice of its patent rights was not properly given if such communications were made in bad faith. *Mikohn Gaming*, 165 F.3d at 898. The facts of this case clearly show that Tri-Star's communications with Preci-Dip's customers were in bad faith.

Federal Circuit precedent states that the bad faith standard requires a showing that the patentee's assertions were objectively baseless. *GP Industries*, 500 F.3d at 1373. The Supreme Court has described the meaning of 'objectively baseless,' explaining that "the lawsuit must be objectively baseless in the sense that no reasonable litigant could realistically expect success on the merits." *Professional Real Estate Investors, Inc. v. Columbia Pictures Indus., Inc.*, 508 U.S. 49, 60 (1993). While *Professional Real Estate* involved an antitrust action, the Federal Circuit has expressly applied the 'objectively baseless' standard to a situation in which "a party challenged statements made in cease-and-desist letters by a patentee asserting its patent rights." *GP Industries*, 500 F.3d at 1374-1375 (quoting *Globetrotter Software, Inc. v. Elan Computer Group, Inc.*, 362 F.3d 1367, 1377 (Fed. Cir. 2004)).

Applying the above standards to the present facts shows that Tri-Star's communications were clearly 'objectively baseless.' First, Preci-Dip's product clearly falls outside the scope of the '974 Patent, as that patent only discloses and claims a "hoodless, two-piece" contact. Preci-Dip's product is a hooded contact that requires three pieces. The claims of the '974 Patent explicitly distinguish this type of contact from the claimed invention. Moreover, Tri-Star consistently attempted to distinguish its claimed invention from prior art hooded contacts by repeatedly arguing to the USPTO that its invention was a "two-piece socket that...[eliminated] a conventional precision hood." Indeed, the USPTO required Tri-Star to amend the title of its application to include the term "hoodless." Moreover, the USPTO issued the '508 Patent to Preci-Dip on its hooded product, despite the existence of the '974 Patent.

Second, Preci-Dip challenged Tri-Star to describe the alleged infringement in its response letter, but Tri-Star failed to do so. Third, Tri-Star filed its lawsuit with obviously no intent to ever serve it on Preci-Dip. And Finally, Tri-Star failed to tell customers why the Preci-Dip

Reversed Clip contact supposedly infringed the '974 Patent.

This is not an issue of Tri-Star investigating Preci-Dip's products and believing that there is a chance that its '974 Patent was being infringed. Rather, Preci-Dip's Reversed Clip Contact is specifically the type of contact that Tri-Star continually and consistently differentiated from its invention in order to obtain its patent. Three-piece, hooded contacts were well known in the art long before Tri-Star obtained its '974 Patent. If this Court determines that Preci-Dip's Reverse Clip contact falls within the scope of the '974 Patent claims, then the patent axiom and numerous-quoted "that which infringes if later, anticipates if earlier" applies, and this Court should invalidate the '974 Patent. *See, e.g., Peters v. Active Mfg.*, 21 F. 319 (W.D.Ohio 1884) (affirmed and quoted in *Peters v. Active Mfg.*, 129 U.S. 530 (1889)). As such, Preci-Dip has easily met its burden, and demonstrated that its chance of prevailing at trial is "better than negligible." A simple reading of the '974 Patent shows that it requires a "hoodless," "two-piece" contact, and as such, Preci-Dip's product falls outside the scope of protection. Moreover, Tri-Star knew or should have known that its assertion of patent infringement had no reasonable expectation of success so that both its lawsuit and its communications to Preci-Dip's customers were objectively baseless. Therefore, Preci-Dip has easily met its burden, and this Court should issue the requested temporary restraining order.

b. *Tri-Star's allegations that Preci-Dip's products did not meet military specifications were also made in bad faith.*

Tri-Star also told Preci-Dip's customers that Preci-Dip's products did not meet military specifications. Loviat Decl., ¶¶ 3, 5. Such false statements, by themselves, are more than enough to show that Preci-Dip is likely to succeed on the merits of its bad-faith-based claims. However, combined with fact that Tri-Star sent objectively baseless assertions that Preci-Dip is infringing the '974 Patent to Preci-Dip's customers, Preci-Dip has more than met its burden to

show that it is likely to succeed on the merits of these various claims. As such, this factor clearly weighs in favor of granting the preliminary injunctions.

**C. Preci-Dip Will Suffer Irreparable Harm if a Temporary Restraining Order is not Entered Because Tri-Star's Continual Bad-Faith Communications will Further Damage Preci-Dip's Reputation and Goodwill**

Irreparable harm is presumed in cases such as this, because "it is virtually impossible to ascertain the precise economic consequences of intangible harms, such as damages to reputation and loss of goodwill, caused by such violations." *Abbot Labs v. Mead Johnson & Co.*, 971 F.2d 6, 16 (7<sup>th</sup> Cir. 1992). Tri-Star's letters and communications include fallacious claims of infringement and non-compliance with various specifications against Preci-Dip, and damage Preci-Dip's reputation among its current and potential customers. Such damage to Preci-Dip's reputation and goodwill is irreparable.

On the other hand, Tri-Star will suffer no such irreparable harm. Should Tri-Star ultimately prove to be successful, it can recoup any royalties under its patent and can recover damages for other breaches if ultimately successful.

**D. Preci-Dip will Lose Significant Goodwill if a Temporary Restraining Order Does Not Issue, and As a Result, the Balance of Hardships Clearly Leans in Preci-Dip's Favor**

The harm which Preci-Dip will suffer to its name and reputation if an injunction is not immediately granted is irreparable and greatly outweighs any harm Tri-Star may potentially suffer. Preci-Dip has already suffered irreparable harm to its name and reputation because of Tri-Star's baseless accusations, and will continue to suffer this irreparable harm if a preliminary injunction is not granted.

Moreover, any harm Tri-Star may claim by being ordered to refrain from making further allegations or accusations during the pendency of this litigation is minimal. Because a suit has been filed where infringement is an issue, Tri-Star has no need to provide notice of infringement.

Legal action has been taken, and the disputed issues await resolution.

In sum, entry of a Temporary Restraining Order will prevent Tri-Star from wrongfully profiting from the baseless ruination of Preci-Dip's goodwill and reputation.

**E. The Grant of a Preliminary Injunction in this Matter is in the Public's Interest**

Preci-Dip is not requesting a grant of an injunction against infringement, but rather an injunction against communication. While, Preci-Dip acknowledges that a patentee has a right to inform others of his or her patent rights, *see, e.g.*, 35 U.S.C. § 287, this right has limitations. The public has, and in this case, customers and distributors have, a right to be free from such specious and spurious claims of patent infringement, threats and harassment. Tri-Star was not attempting to exercise its rights, but rather was attempting to harm Preci-Dip's relationships through improper means and intimidation. Such actions should not be protected, and should be enjoined.

**IV. CONCLUSION**

Preci-Dip has established each factor necessary for the issuance of a Temporary Restraining Order, enjoining Tri-Star from issuing further statements to Preci-Dip's customers or potential customers, or its end-users, either orally or in writing, either directly or indirectly that any of Preci-Dip's products infringe on the '974 Patent or any other patent owned by Tri-Star. Preci-Dip, therefore, respectfully requests that this Court grant its Motion and enter a Temporary Restraining Order against Defendants.

Dated: August 15, 2008

Respectfully Submitted,

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**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that a copy of the foregoing **MEMORANDUM IN SUPPORT OF PLAINTIFF'S MOTION FOR A PRELIMINARY INJUNCTION**, has been served upon the individuals listed below via the CM/ECF electronic filing service system and via Federal Express on this 15th day of August, 2008.

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# EXHIBIT 1



IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF ILLINOIS  
EASTERN DIVISION

PRECIDIP SA,  
a Swiss Corporation,

Plaintiff,

v.

TRI-STAR ELECTRONICS  
INTERNATIONAL, INC.,  
a California Corporation,

Defendant.

Case No. 1:08-cv-4192

JUDGE GUZMAN

MAGISTRATE JUDGE ASHMAN

**DECLARATION OF PATRICK LOVIAT**

I, Patrick Loviat, hereby state that I am a citizen of Switzerland and an employee of Preci-Dip SA, the Plaintiff in the above matter. I further state that if called as a witness in this case, I would and could testify competently to the following:

1. I am a key account manager for the Military/Aero business of Preci-Dip SA based in Delemont, Switzerland. In that capacity, I am responsible for managing accounts of key customers and potential customers for the interconnect products manufactured and sold by Preci-Dip, particularly those made in accordance with military specifications, such as MIL-C-39029.

2. Preci-Dip manufactures a product called a Reversed Clip Contact covered by Preci-Dip's U.S. Patent No. 6,264,508 (the "'508 patent"). A copy of the Pre-Dip '508 patent is attached hereto as Exhibit A. The Reversed Clip Contact is made in accordance with MIL-C-39029.

3. In late June, 2008, Preci-Dip learned from a customer that Tri-Star Electronics' International, Inc., had apparently filed a complaint in Federal Court in Los

Angeles alleging that Preci-Dip's Reverse Clip Contact infringed the claims of Tri-Star's U.S. Patent No. 6,250,974 (the "'974 patent"). Preci-Dip had not, at that time, received a copy of this complaint nor had it been contacted by Tri-Star with respect to this complaint.

4. When Preci-Dip began to hear from other customers that Tri-Star was contacting them with respect to Preci-Dip's alleged infringement of the '974 patent and because Preci-Dip was convinced, based on its prior investigation and its consultation with counsel that no such infringement existed, we contacted customers by telephone regarding this situation.

5. During the first week of July 2008, we called numerous customers to determine if they had received any communications from Tri-Star regarding its patent claims and what impact such communications might have had. These conversations indicated to us that several customers had been contacted by Tri-Star and that such contacts had adversely impacted Preci-Dip's relationship with them. In particular, I note the following:

- (a) Customer A (I have not used names because I understand this document is to be public and I wish to protect them from further pressure by Tri-Star) asked how we want them to respond to Tri-Star's order to stop selling Preci-Dip MIL-C-39029 contacts.
- (b) Customer B received a letter from Tri-Star and then a call from David Bouzek of Tri-Star. Customer B told me that Tri-Star said that Preci-Dip contacts are not completely fulfilling the requirements of MIL-C-39029. That representation is not true.
- (c) Customer C received the Tri-Star letter and then a phone call from David Bouzek.
- (d) Customer D received the letter from Tri-Star and cancelled its order with Preci-Dip. Customer D said it was an authorized distributor of Tri-Star products but believed that if Tri-Star found

out it was ordering Preci-Dip Reversed Clip Contacts it would terminate its distributorship.

6. Based on concerns from our customers, I traveled to the United States with Jean-Paul Müller, our Sales and Marketing Director, and we met with customers in various locations. These discussions confirmed that Tri-Star had not only sent letters to customers, but also had called and attempted to pressure and harass our customers, including our distributors, into ceasing sales of the Preci-Dip Reversed Clip product.

7. For example, on July 17, 2008, we visited Customer E. This customer acknowledged that they had received a letter from Tri-Star with a copy of the complaint. On the basis of that letter, they were reluctant to ship the Preci-Dip products that they had in stock and, in fact, quarantined these products and put shipments on hold. Also, we should have received a big purchase order at that time that has been frozen. The customer's position is "wait and see".

8. On July 18, 2008, we visited Customer D, with whom we have been working for many years. In 2006, Customer D terminated a distribution contract with Preci-Dip because they were under pressure from Tri-Star with whom they did have a distribution agreement. Customer D confirmed its cancellation of an order from M39029 contacts with Preci-Dip because they told me they feared they would be terminated by Tri-Star if they bought this product from us. This is despite the fact that Customer D does not view Tri-Star's prices as competitive with Preci-Dip's prices and despite the fact that Tri-Star does not sell a hoodless product in accordance with its patent. This customer has quoted some prices to his own customers based on Preci-Dip prices. He has received the orders and will have to honor them based on Tri-Star prices. He will run that business with a loss or to break even point.

9. On July 21, 2008, I visited Customer F which was holding up payments to Preci-Dip until it discussed the Tri-Star lawsuit.

10. On July 22, 2008, I visited Customer G. This is a distributor for Preci-Dip, but had received a letter with the lawsuit from Tri-Star. Customer G mentioned that legal actions in the United States have a major importance whether well-founded or not and that the normal position of somebody receiving such a letter is to avoid buying Preci-Dip contacts.


11. On July 23, 2008, I met with Customer H who received a copy of the Tri-Star mailing from another company.

12. On July 23, 2008, I met with Customer I which had received the Tri-Star letter as well as a phone call from Mr. Bouzek. According to this customer, Mr. Bouzek told them that they had better think twice before purchasing Preci-Dip M39209 contacts.

13. As a result of these Tri-Star letters and calls to many of our customers and distributors as well as potential new customers, I have the following opinions:

- (a) Most of these customers have been frightened by the Tri-Star letter and call and are afraid that Tri-Star will sue them. They don't like to have their name mentioned in a court.
- (b) Most of these customers are very competent from a technical, engineering standpoint and readily see that there is a fundamental difference between the Tri-Star patent and our patent and product and believe that the Tri-Star suit has no basis.

I hereby declare under penalty of perjury under the laws of the United States that the above statements are true and correct based on my own knowledge or on information supplied to me by others which I believe to be true.

  
\_\_\_\_\_  
Patrick Loviat  
Preci-Dip SA

August 15<sup>th</sup>, 2008  
Date

NGEDOC5: 1555490.2

# EXHIBIT 2

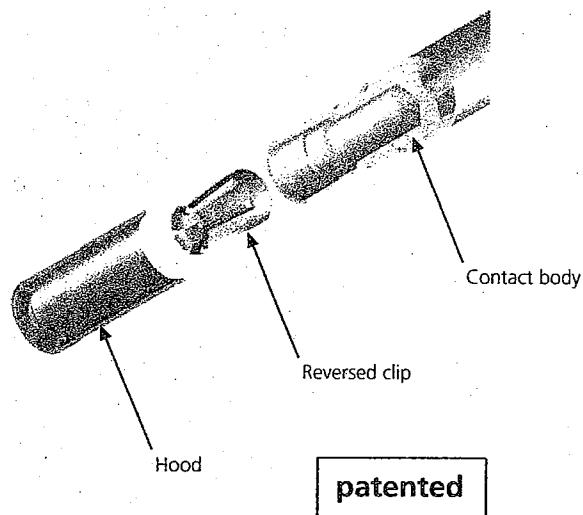


## Contact technology

### MIL contacts

#### MIL contacts with reversed clip

The clip technology for socket contacts was improved with the introduction of a new, patented, reversed clip. This was designed to overcome some limitations of the basic clip especially to place the first contact point closer to the front end of the contact. The geometry of the contact fingers shows a very smooth contact area allowing for high cycles count.



The technical characteristics of reversed clip contacts match with the highest requirements of military specification MIL-C-39029.

This standard is the reference for many connectors dedicated for other fields of applications like aircrafts, railway and heavy duty industries.

Further, the three part design of these contacts allows localized finish for best cost-performance ratio.

Crimp contacts in the MIL sizes 22, 20, 16 and 12 have passed successful all qualification tests according to MIL-C-39029 and are now QPL listed. In addition, the corresponding pin contacts were qualified.

The test results have shown results that are much superior to specs requirements.

These contacts must be supplied with color coding for single contact identification. PRECI-DIP DURTAL has completed its manufacturing capacities with marking equipment for color code.



MIL contact with colour code

Type of contact	Size	MIL part number	Preci-Dip part number
Socket	22	M39029/56-348	83011-1P4-7010-B1
	20	M39029/56-351	83021-1P4-7110-B1
	16	M39029/56-352	83031-1P4-7210-B1
	12	M39029/56-353	83041-1P4-7310-B1
Pin	22	M39027/58-360	82011-40-01
	20	M39027/58-363	82021-40-01
	16	M39027/58-364	82031-40-01
	12	M39027/58-365	82041-40-01

These contacts are intended for use in connectors acc. to MIL-C-38999 I, III and IV

Due to technical progress, all the information provided is subject to change without prior notice

# EXHIBIT 3



(12) **United States Patent**  
**Lehmann**

(10) **Patent No.:** **US 6,264,508 B1**  
(45) **Date of Patent:** **Jul. 24, 2001**

(54) **FEMALE TYPE CONTACT PIECE  
ENABLING ELECTRICAL CONTACT WITH  
A MALE ELEMENT**

5,322,459 \* 6/1994 Spinnato ..... 439/843  
5,419,723 5/1995 Villiers et al. .  
5,516,310 5/1996 Sawada .  
5,897,404 \* 4/1999 Goodman et al. .... 439/843

(75) **Inventor:** **Pierre Lehmann, Courcelon (CH)**

**FOREIGN PATENT DOCUMENTS**

(73) **Assignee:** **Preci-Dip Durtal SA, Delemont (CH)**

0 090 549 A2 10/1983 (EP) .  
2 775 389 8/1999 (FR) .

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

\* cited by examiner

(21) **Appl. No.:** **09/499,638**

*Primary Examiner*—Tulsidas Patel  
*Assistant Examiner*—Brian S. Webb  
(74) *Attorney, Agent, or Firm*—Oliff & Berridge, PLC

(22) **Filed:** **Feb. 8, 2000**

(30) **Foreign Application Priority Data**

Nov. 30, 1999 (EP) ..... 99811102

(51) **Int. Cl.<sup>7</sup>** ..... **H01R 13/187**

(52) **U.S. Cl.** ..... **439/843**

(58) **Field of Search** ..... 439/843, 844,  
439/851, 852, 853, 854

(56) **References Cited**

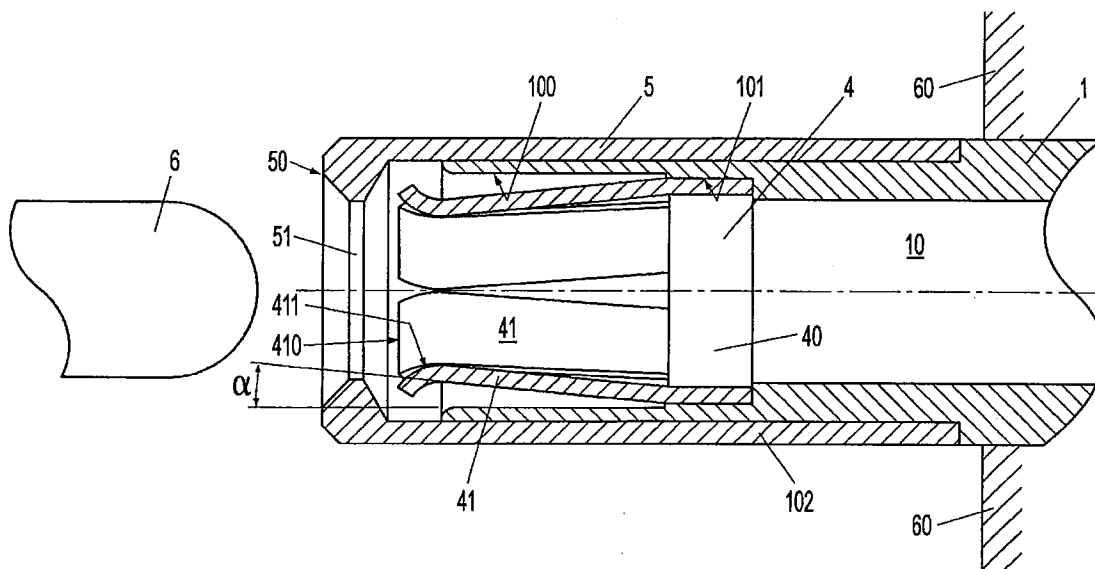
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2,689,337 9/1954 Burtt et al. .  
3,564,487 2/1971 Upstone et al. .  
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4,685,761 \* 8/1987 Locati ..... 439/843

**(57) ABSTRACT**

The contact piece (1) comprises a portion of female type able to accommodate a corresponding portion of male type. This female type portion includes a contact clip (4) provided with elastic fingers (42) oriented towards the opening of a lodging (10) destined to accommodate said male type portion. The piece is completed with a bushing (5) encircling the clip and provided with a front side (50) comprising a passage opening (51) serving as gauge, accepting or refusing the passage of a male portion according to its diameter. In this manner, the elastic fingers (42) always operate in an elastic mode and never suffer a permanent deformation. Such a disposition has many other advantages.

**20 Claims, 2 Drawing Sheets**



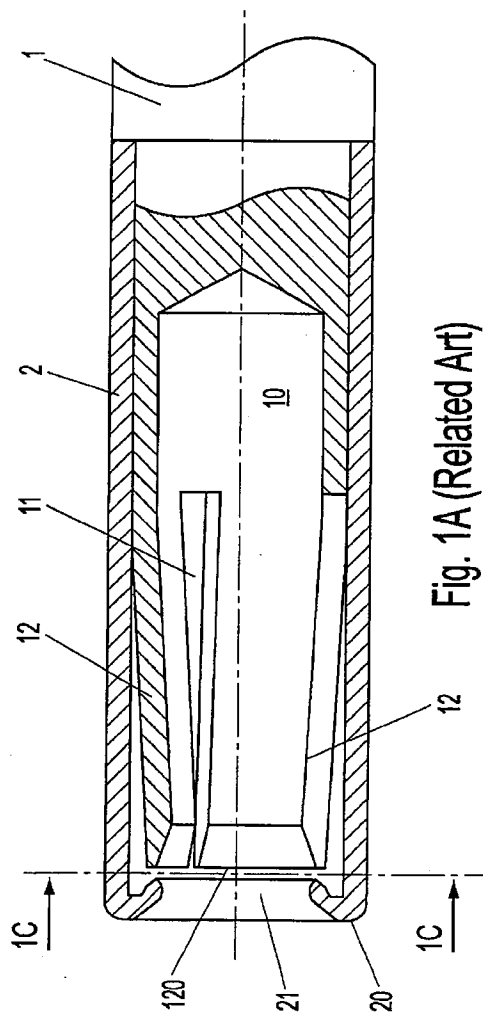


Fig. 1A (Related Art)

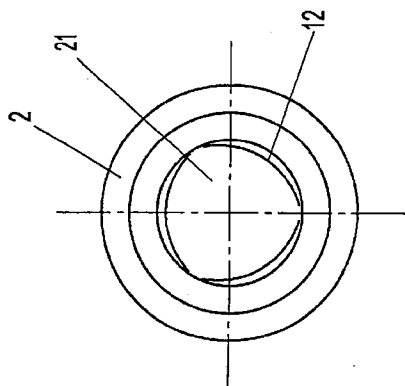


Fig. 1B (Related Art)

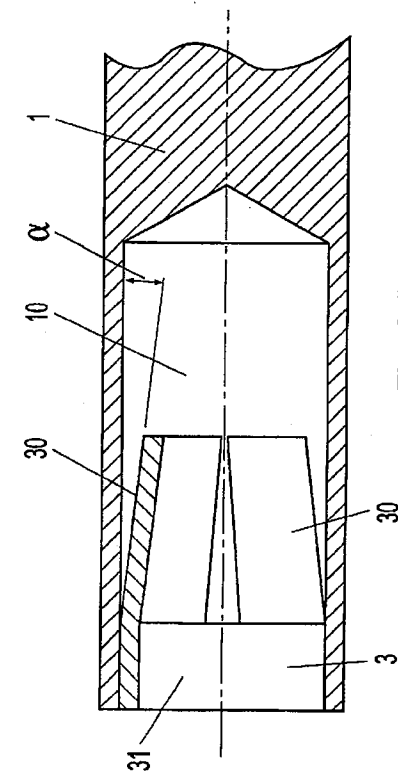


Fig. 2 (Related Art)

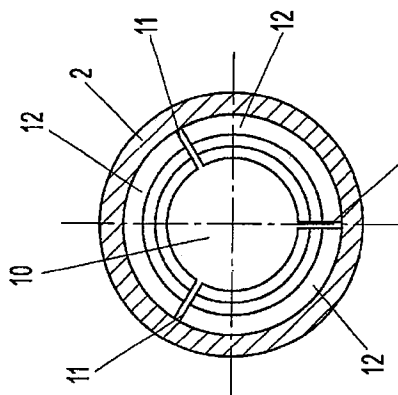
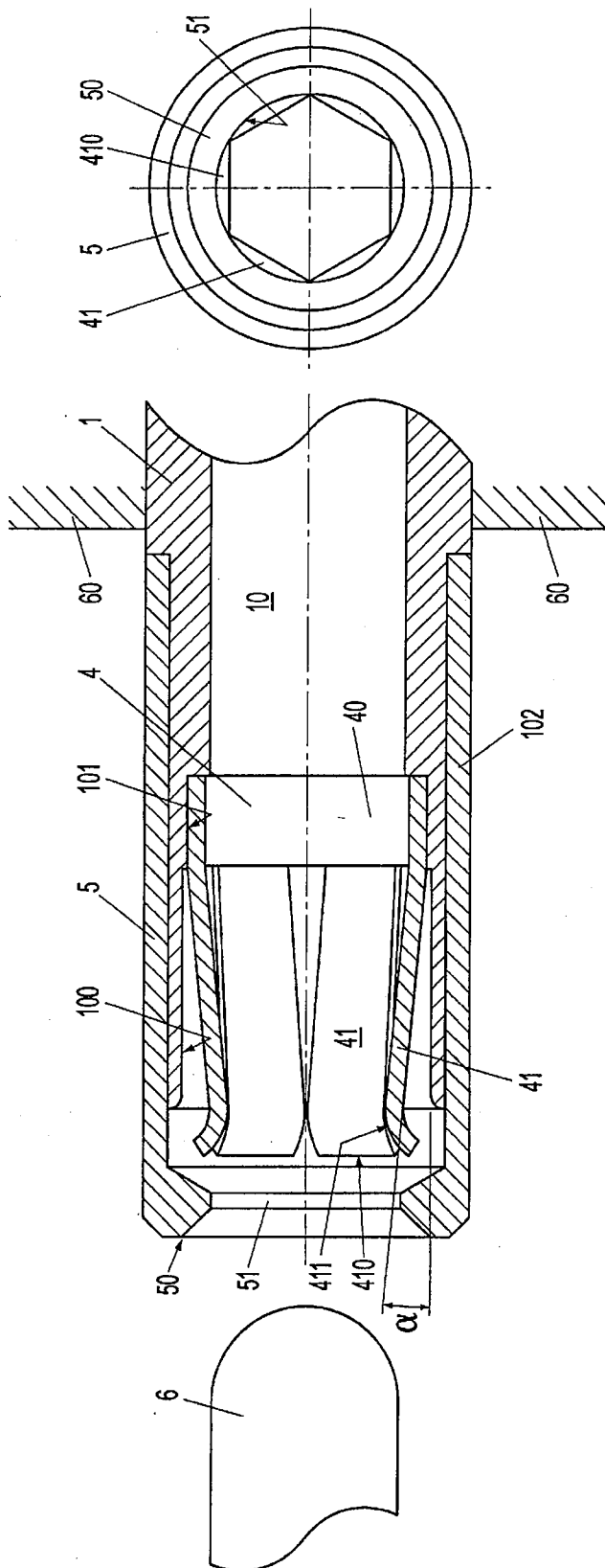


Fig. 1C (Related Art)



**Fig. 3B**

Fig. 3A

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## FEMALE TYPE CONTACT PIECE ENABLING ELECTRICAL CONTACT WITH A MALE ELEMENT

The content of Application No 99811102.5, filed Nov. 30, 1999 in Europe, is hereby incorporated by reference.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention concerns a contact piece of the female type usable in a connector, for example a connector answering the MIL norm or any other specification, or for any other application, such as for example in an integrated circuit base, or destined to be placed on a printed circuit board. The invention concerns more particularly the portion of this contact piece destined to accommodate the corresponding element of the male type.

#### 2. Description of the Related Art

Several specifications or norms, notably the MIL norms and in particular the MIL-C 39029 norm, define a certain number of characteristics which this portion of the contact piece must comply with, for example contact resistance, engagement and separation force of the male contact piece, depth of engagement of the male piece before contact is established etc. According to these norms, these various parameters are to be measured both when the pieces are new as well as after multiple uses, and this under very diverse environmental, temperature, humidity and other conditions.

In order to attempt to comply with these requirements, manufacturers have proposed various constructions of this portion of the contact piece.

Several known embodiments of such portions of contact pieces will be described further below, in connection with FIGS. 1A and 1B as well as FIG. 2; these embodiments encounter notably the following disadvantages according to the constructions described: need to work the entire contact piece in a costly metallic alloy since it must have excellent electrical conduction properties as well as excellent mechanical properties, notably spring power, need to heat treat at least several portions of the piece in order to give it the necessary mechanical characteristics, need to cover the whole piece, or an important portion thereof, with costly plating, of gold or silver, in order to give it the necessary electrical characteristics, difficulty to comply with certain norm requirements, notably MIL norms, lack of any possibility of interchanging the different elements of the contact piece, etc.

### SUMMARY OF THE INVENTION

An object of the present invention is thus to propose a contact piece comprising notably a female portion destined to accommodate a corresponding male portion, of improved construction relatively to the known contact pieces, so as to avoid the aforementioned inconveniences of these contact pieces.

To achieve this object, a contact piece is proposed as described in the independent claim, particular embodiments or variants being described in the dependent claims. The last claims indicate more precisely some possible uses of such a contact piece.

### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in detail below, this description, which further includes certain advantages of the invention, making reference to the attached drawing comprising the figures, in which:

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FIGS. 1A, 1B and 1C represent a portion of a contact piece according to a prior art construction, seen in partial longitudinal section, in elevational projection and in cross section, respectively,

FIG. 2 represents a portion of a contact piece according to another prior art construction, seen in partial longitudinal section, and

FIGS. 3A and 3B represent a portion of a contact piece according to a preferred embodiment of the invention, seen in partial longitudinal section and in elevational projection, respectively.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following description as well as in all the figures, only the female type portion of the contact piece 1, destined to accommodate a corresponding male type element, will be mentioned or represented. This male element is constituted of a pin, its mating end being hemispherical or shaped like a truncated cone, and having a determined diameter. This male element can be the male portion of a corresponding contact piece or else a pin of an integrated circuit or even a connecting part of an electronic component etc. The other portion of the contact piece 1, not described or represented here, can be of any known type for this kind of contact piece and can comprise for example a portion in which a wire can be crimped, screwed or soldered, or a fastening portion on a connector or printed circuit board or a second female type portion to constitute a transition contact piece, etc.

According to the simplest embodiment known, the portion of the contact piece which is of interest here is constituted of an axial bore of one of the contact piece's extremities, followed by the making of radial slits on a portion of the length of the tubular portion realized by the bore, so as to form elastic tongues or fingers. These fingers are then pressed together so as to form an elastic clamp. This construction has many inconveniences, namely a risk of permanent deformation of one or many of the fingers in the case of the askew engagement of a male element or the engagement of a male element of too big a diameter. Furthermore, although the contact piece is constituted of only one piece, it is costly as the necessary material must have the electrical and mechanical properties required for its functioning.

A first advantages modification made to the above contact piece includes in covering the portion in question with a bushing, as seen in FIGS. 1A, 1B and 1C. One can see in these figures the contact piece 1, constituted essentially of a metallic pin of which one end, visible in the figure, is destined to accommodate a male element, not visible in the figures. The other end of the contact piece, not visible in the figures, is worked in a conventional manner to fulfil any known function of such a contact piece. It can be seen that the portion of the contact piece 1 which is of interest here has been bored axially, so as to build a lodging 10 in which the male element will come to be lodged. Slits 11, three in the embodiment represented here, have been shaped in order to separate three fingers 12. The free extremities 120 of these three fingers 12 are then pressed together, by permanent deformation, so as to close slightly the clamp formed by the three fingers, as can be seen in the figures. As described so far, this construction represents the first embodiment described previously. In order to prevent too strong an opening movement of the fingers 12, this portion of the contact piece is provided with a tube-shaped bushing 2, affixed by crimping or any other means onto the portion of

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the contact piece 1 behind the fingers 12. This bushing 2 abuts against the external surfaces of the fingers 12, preventing these from being moved apart too much.

The extremity of bushing 2 facing the opening of lodging 10 comprises an end side 20 provided with a traversing opening 21 coaxial to the longitudinal axis of contact piece 1, respectively of lodging 10. The diameter of this opening 21 is determined so as to let pass only a male element of a diameter inferior to that of a male element which would flatten the fingers 12 against the bushing 2.

The opening 21, coaxial to the longitudinal axis of the lodging 10 further serves as guiding means of the male element when mating.

Although this latter construction limits the risk of deformation of the fingers 12 when a male element having too wide a diameter or being not aligned is engaged, the pressure applied by the bushing 2 on the fingers 12 when these are apart, notably on the rear portion of these fingers, means that the latter no longer work fully elastically, which in particular decreases the electric conducting qualities of the contact, notably in case of vibrations.

The inconvenience of machining the fingers 12 and the rest of the contact piece 1 from a single rough piece, i.e. of the same material, remains and results in a costly contact piece. For the same reasons, it is difficult and/or expensive to shape the extremities 120 of the fingers so that they become rounded for an easier mating of the male element; a slightly askew engagement of the male element relative to the longitudinal axis of the lodging 10 can result in the male element being brought to bear against the extremity 120 of a finger, leading this finger to be bent towards the inside of lodging 10, i.e. to the contact piece being destroyed.

FIG. 2 shows a construction proposed to remedy these last flaws.

As previously, one has a contact piece 1 whose extremity that is of interest here is provided with an axial bore forming a lodging 10 for the male element to be accommodated. A contact clip 3 is inserted inside lodging 10. The contact clip 3 is formed from a metallic band, of a width corresponding to the length of the clip, which is embossed so as to form a lateral strip fitted with several fingers of an essentially trapezoidal shape, projecting on one of the sides of the lateral strip, the larger bases of each finger being adjacent to the lateral strip whereas the small bases are free. The strip is divided in portions, each comprising several trapezoidal fingers of the length of the portion corresponding to the interior perimeter of the lodging 10. The portion of strip is then coiled, the fingers being then pressed together by their extremities so as to deform them and decrease the inscribed diameter between the free extremities of the fingers. The clip 3 thus formed is inserted in the lodging 10, the free extremities of the fingers 30 being directed towards the bottom of lodging 10; the portion 31 of clip 3, formed by the aforementioned lateral strip, is maintained towards the open extremity of lodging 10 by any known means, insertion, crimping or other.

According to this construction, only clip 3 must be made of an alloy having excellent conductive qualities as well as excellent mechanical qualities of spring power. Therefore, the rest of contact piece 1 can be worked in a cheaper metal or alloy, for example brass. The clip 3 will be constituted preferably of a bronze/beryllium alloy or other.

During the mating of a male element, the fingers 30 move apart in order to clamp said male element. The moving apart of the fingers 30 is also restricted here by the inner surface of the lodging 10, with the same inconveniences as mentioned above.

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Another inconvenience of this construction is that, in view of the low value of the angle  $\alpha$  relative to the longitudinal axis formed by the fingers 30 pressed together, relative to the longitudinal axis of the lodging 10, the length at which it is necessary to engage the male element into the lodging 10 before its extremity comes into contact with the fingers 30 is important. Increasing this angle in order to diminish this distance could lead to the fingers 30 buttressing against the male element when the latter is withdrawn, thus causing it to be spoiled.

All the inconveniences mentioned previously in relation to the known constructions of the prior art are remedied by the construction according to the invention, of which a preferred embodiment is represented in FIGS. 3A and 3B. FIG. 3A shows a male element 6 for connection to the contact piece and a connector, component or printed circuit board 60 fitted to the contact piece.

As previously discussed, one has a contact piece 1 whose extremity destined to accommodate the male element 6 is bored longitudinally so as to form a lodging 10 for accommodating the male element. The open extremity of lodging 10 comprises a first inner cylindrical neck 100, whose interior diameter is superior to that of lodging 10, followed by a second inner cylindrical neck 101 whose inner diameter is comprised between that of neck 100 and that of the bottom of lodging 10.

A contact clip 4 is inserted by the open extremity of lodging 10, so that its cylindrical portion 40 comes to be positioned on the inner cylindrical neck 101.

The clip 4 is obtained preferably in a manner rather similar to that which has been described previously for clip 3. A complementary arching operation towards the outside of the fingers' extremities is conducted when the clips are always assembled in a continuous strip. As an alternative to the trapezoidally shaped lamellae described, one can also have lamellae of a rectangular shape and separation slits of a trapezoidal shape.

The clip 4 is fastened, by pressing in, crimping or any other known means on this inner neck 101. Unlike what has been described above in connection with clip 3, the contact fingers 41 of clip 4 have their free extremities 410 facing the opening of lodging 10. Furthermore, these free extremities 410, for each of the fingers 41, are formed so as to present an arched end portion 411, the free extremity directed towards the exterior being moved away from the longitudinal axis of lodging 10. This device is completed by an external bushing 5 pressed on and fastened on an outer cylindrical neck 102 of the contact piece 1. The extremity of bushing 5 facing the opening of lodging 10 comprises an end side 50 provided with a traversing opening 51 coaxial with the longitudinal axis of the contact piece 1, respectively of lodging 10. The diameter of this opening 51 is determined so as to let pass only a male element 6 of a diameter acceptable by the contact clip 4. It can further be seen in the figure that if a male element 6 has been engaged into clip 4, its diameter being lower than the diameter of opening 51, the moving apart of the fingers 41 of clip 4 is never restricted by the inner diameter of neck 100, since it is superior to that of neck 101, nor by the inner diameter of bushing 5, since it is greater than that of neck 101, nor by the inner diameter of bushing 5, since the latter is dimensioned so as to allow the fingers 41 to move away to a maximum. Thus, for a determined diameter, respectively gauge, of a male element 6, the corresponding female contact piece comprises a contact clip 4 whose fingers 41 are subjected to an exclusively elastic deformation, on their whole length and on their



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whole range of deformation, the diameter limitation of the male element 6 being determined by the calibrated opening 51 of the bushing 5. This operating method in elastic mode ensures a maximum electrical conductivity of the contact, even in case of vibrations.

The angle  $\alpha$  of each finger relative to the longitudinal axis is also small; this angle is typically comprised between 4° and 10°, being preferably comprised between 6° and 8°. In view of the arched portion 411 of the fingers 41, the male element cannot be buttressed when engaged or withdrawn from the fingers 41.

Another advantage of the presence of the arched portion is that the fingers 41 thus offer a greater contact surface with the male element, decreasing consequently the contact resistance between the female contact piece and the male contact piece.

Another advantage of this arched portion is a better transmission of the mechanical power between the male element and the clip, notably in the presence of vibrations. A spoiling of the contact surface of the male element in case of vibrations has namely been observed when the extremities of the contact fingers present an edge rather than a rounding as described for this embodiment.

Another advantage of this device is that the length of engagement of the male element before a contact is established is short since the male element meets first the portion of small diameter of the clip 4 formed by the fingers 41 pressed together.

Yet another advantage of this device is that the opening 51, aligned with the free extremities 410 of the fingers 41 forms a two point guiding means of the mating male element, thus preventing it from engaging askew.

The presence of the bushing 5 over the region of the contact piece 1 where the clip 4 is inserted and fastened ensures a mechanical reinforcement of the latter region by banding, respectively a better fastening of clip 4.

Tests have shown that when a male element mates with a female contact piece as represented in FIG. 2, either with a contact clip with the free extremities of the fingers facing the bottom of lodging 10, one has first a power peak as soon as the contact between the male element and the fingers is established, followed by an approximately constant force of lower value. On the other hand, when a male element engages in a contact piece according to the invention, one has a constant engagement force of low value, without the initial peak. The engaging movement of the male element in the female element is therefore much smoother, thus sparing the state of the male element's surface and reducing the risk of breakage of the male element, notably in the case of a pin of an integrated circuit which must be inserted into a base.

The separate manufacture of the clip and of the rest of the contact piece has many advantages, such as optimizing the choice of material for one or the other components according to the requirements, heat and/or surface treatment adapted for each element, separate management of the stocks of clips and of connecting pieces according to different types, for fastening on connectors, on integrated circuit bases or on printed circuits etc., these different qualities bringing about an overall decrease in the production costs.

The contact piece 1, with the exception of clip 4, will be manufactured in a low-cost metal or alloy, for example brass or more particularly brass able to bear the crimping of a conductor in the portion of the contact piece 1 opposite that described in detail here above. The clip 4 will be manufactured preferably in an alloy of bronze and beryllium.

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What is claimed is:

1. A contact piece for use with a corresponding male type element, comprising:

5 a portion having a female type end, and a lodging disposed axially in said portion for accommodating the corresponding male type element, said lodging including a contact clip for ensuring electrical contact between said corresponding male type element and the contact piece, said contact clip including a front extremity provided with a plurality of elastic contact fingers each finger, including a free extremity directed towards an opening of said lodging and a rear extremity in the form of an annular crown on which said contact fingers are fastened, said annular crown being fitted inside of a front part of said lodging.

2. Contact piece according to claim 1, wherein each of said fingers is inclined by an angle  $\alpha$  relative to the longitudinal axis of said lodging.

3. Contact piece according to claim 2, wherein the angle  $\alpha$  is comprised between 4° and 10°.

4. Contact piece according to claim 3, wherein the angle  $\alpha$  is comprised between 6° and 8°.

5. Contact piece according to claim 1, wherein each finger comprises an arched portion near its free extremity, the edge of said free extremity moving away from the longitudinal axis of said housing.

6. Contact piece according to claim 1, wherein it further comprises an essentially tube-shaped bushing encircling the portion of the contact piece fitted with said contact clip, said bushing being provided with a front side comprising a passage opening coaxial to the longitudinal axis of the lodging.

7. Contact piece according to claim 6, wherein the bushing comprises a cylindrical rear portion fastened on a corresponding cylindrical neck of said contact piece.

8. Contact piece according to claim 6, wherein the passage opening has a diameter which allows a male element with a diameter equal or inferior to a determined diameter to engage and prevents a male element with a diameter greater than a determined diameter to engage in said portion of the contact piece of female type.

9. Contact piece according to claim 8, wherein the diameter of said lodging in its portion encircling said fingers is greater than the diameter circumscribed by said fingers when these are moved apart by a male element having said determined diameter has been mated in said contact piece.

10. Contact piece according to claim 8, wherein when a male element having said determined diameter or an inferior diameter is engaged between the fingers of the contact clip, no portion of the contact piece or of the bushing limits the moving apart of said fingers.

11. Contact piece according to claim 8, wherein when a male element having said determined diameter or an inferior diameter is engaged between the fingers of the contact clip, the moving apart of said fingers is an elastic movement.

12. Contact piece according to claim 8, wherein said passage opening and the arched portions of the elastic fingers constitute a guiding means of the male element during mating.

13. Contact piece according to claim 1, wherein said contact piece and the clip are manufactured in different materials.

14. Contact piece according to claim 13, wherein the contact piece is of brass.

15. Contact piece according to claim 14, wherein the contact piece is of a brass alloy able to bear crimping.

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16. Contact piece according to claim 13, wherein the clip is of an alloy of bronze and beryllium.

17. Contact piece according to claim 1, wherein it complies with the norm MIL-C 39029.

18. Connector fitted with at least one contact piece 5 according to claim 1.

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19. Component base fitted with at least one contact piece according to claim 1.

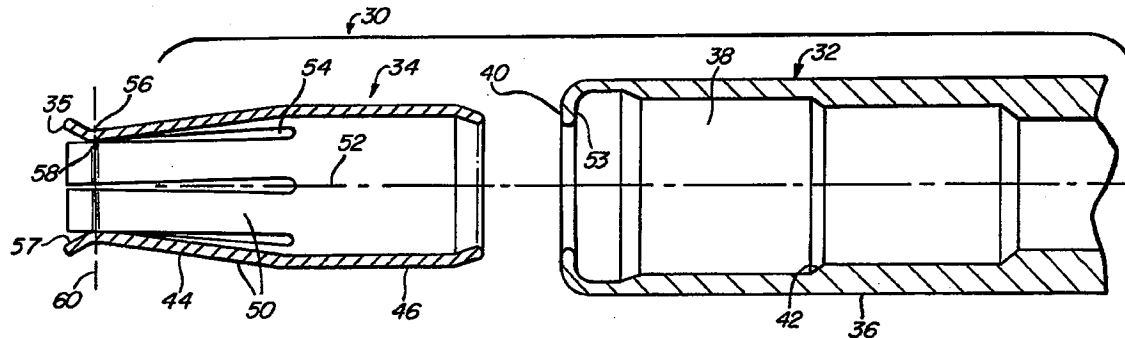
20. Printed circuit board fitted with at least one contact piece according to claim 1.

\* \* \* \* \*

# EXHIBIT 4



(45) **Date of Patent:** **Jun. 26, 2001**



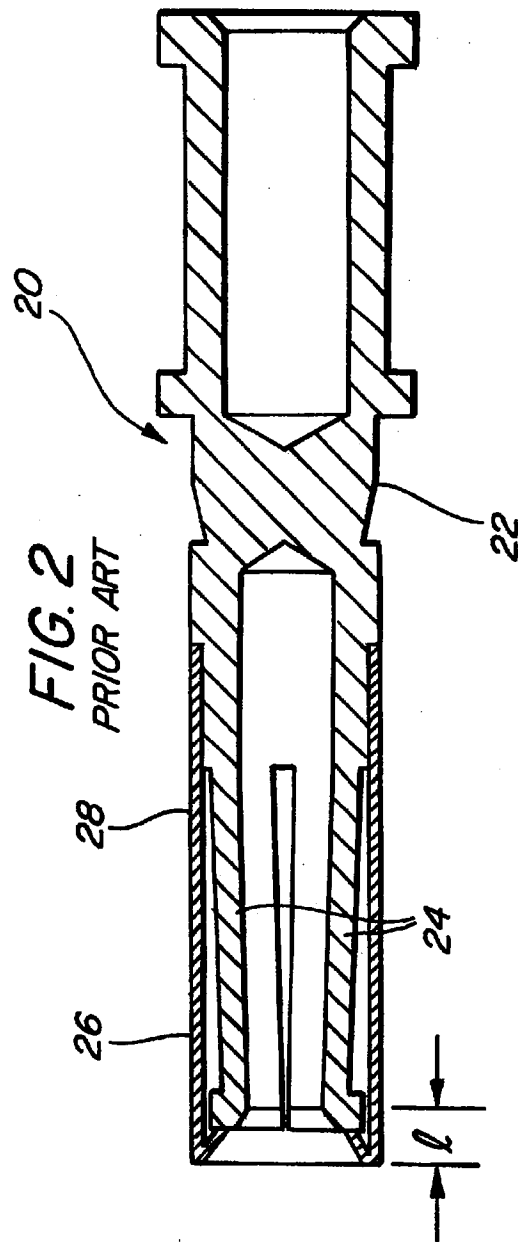
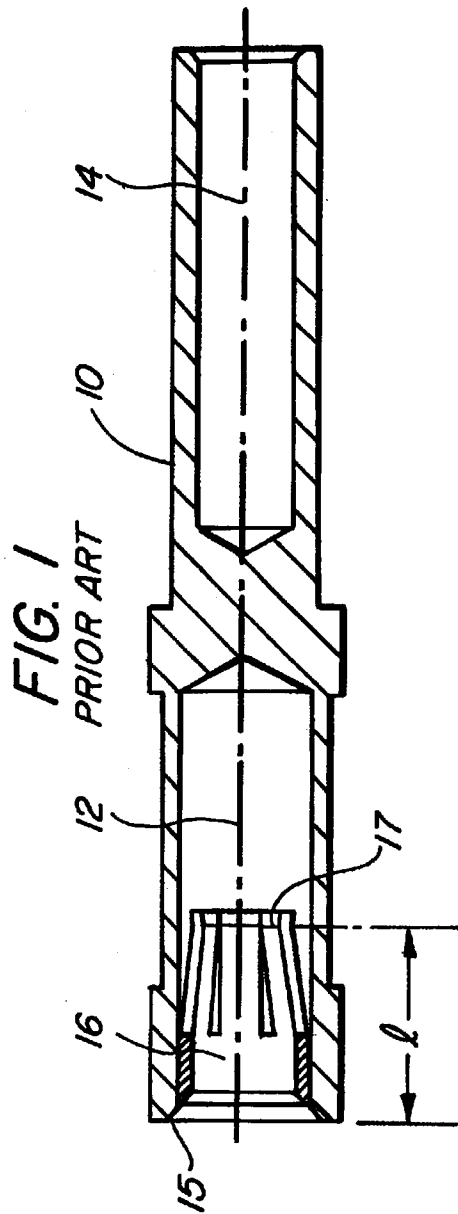


FIG. 3

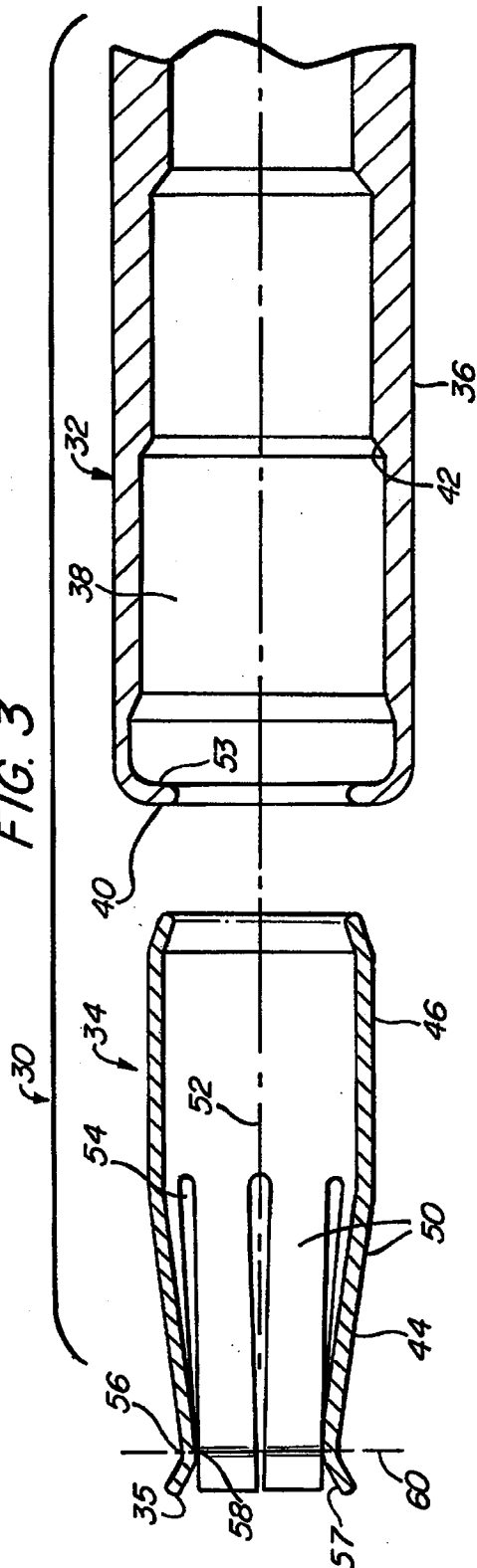
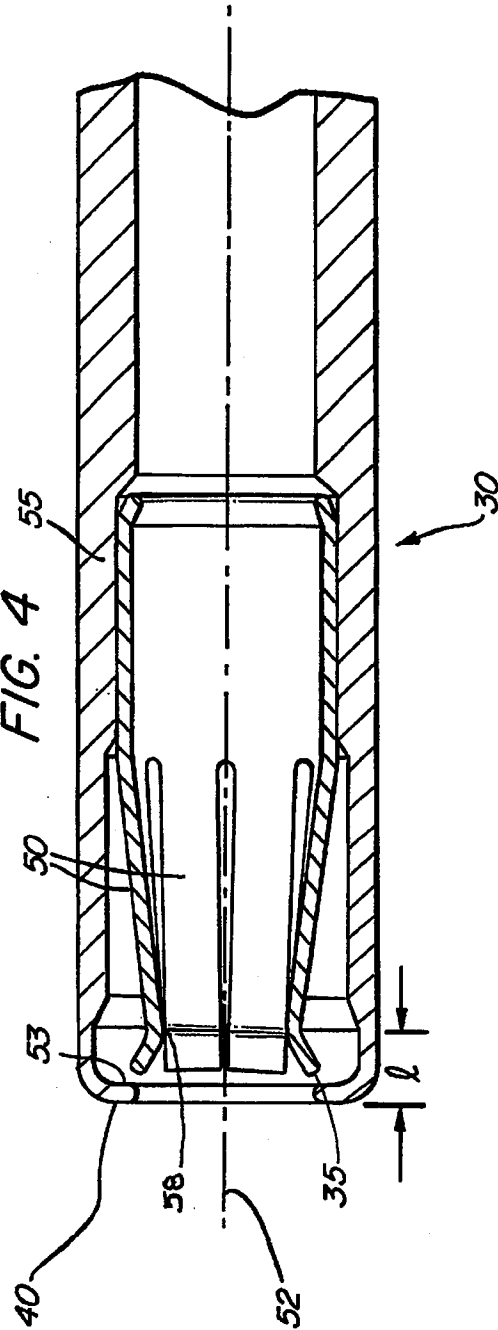
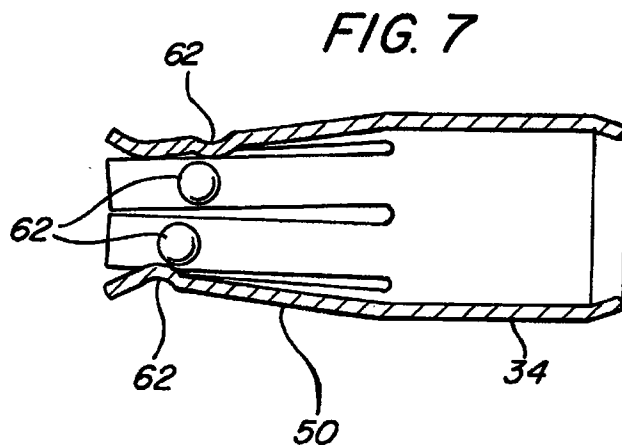
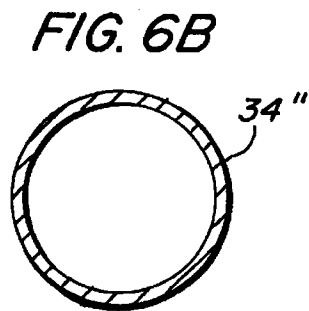
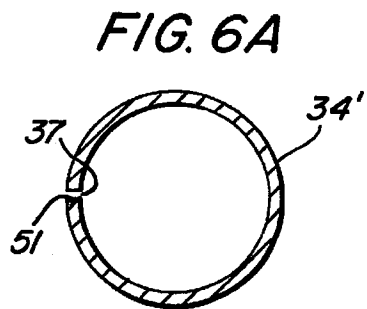
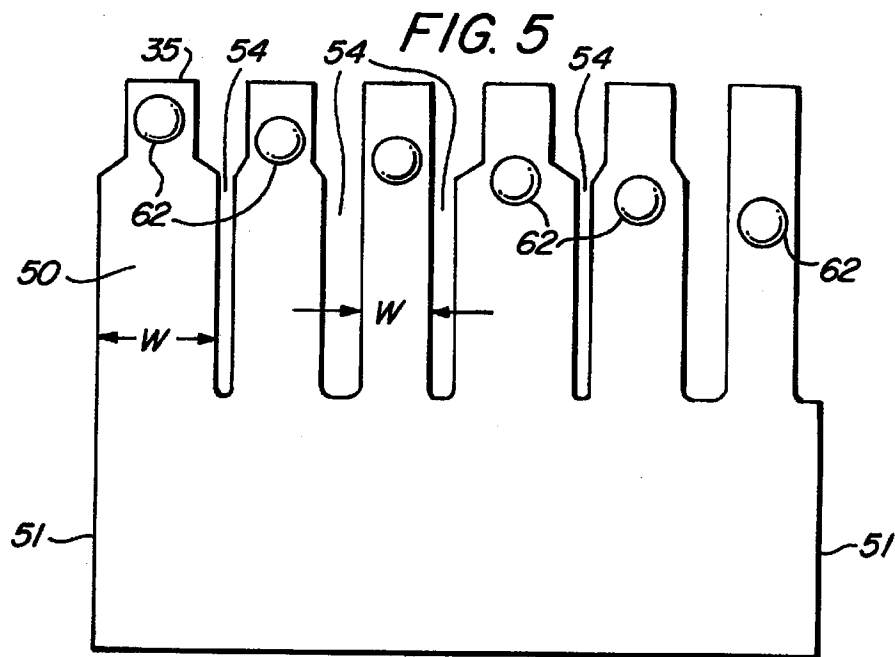
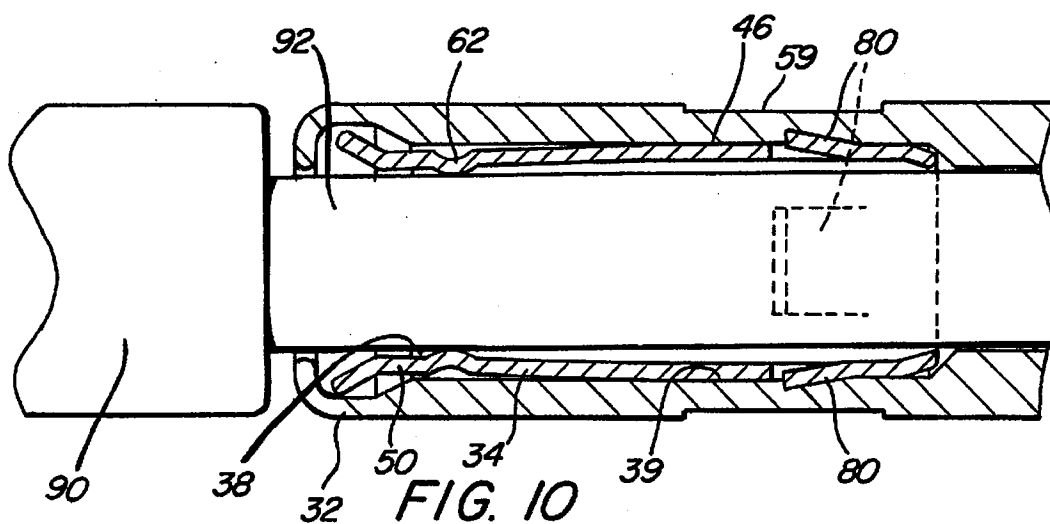
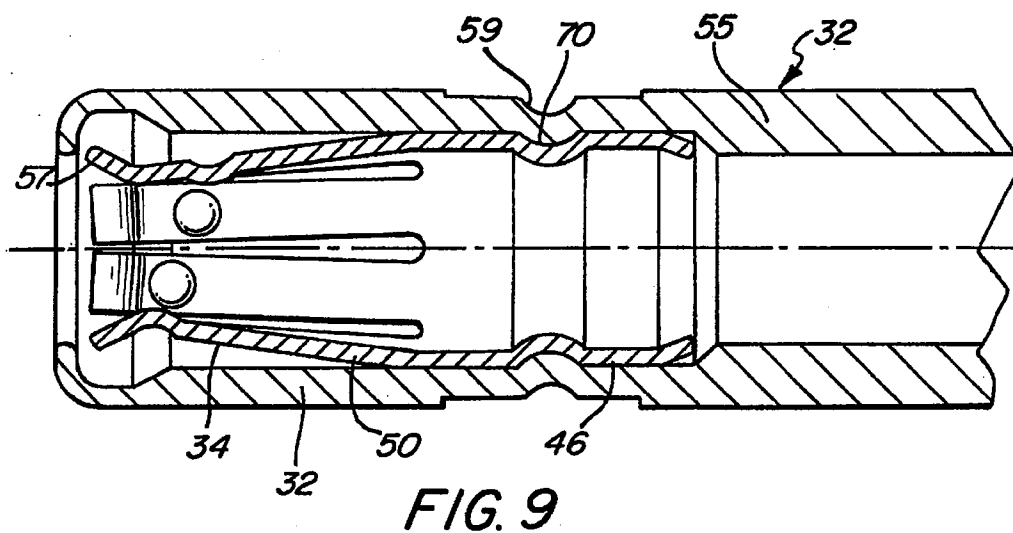
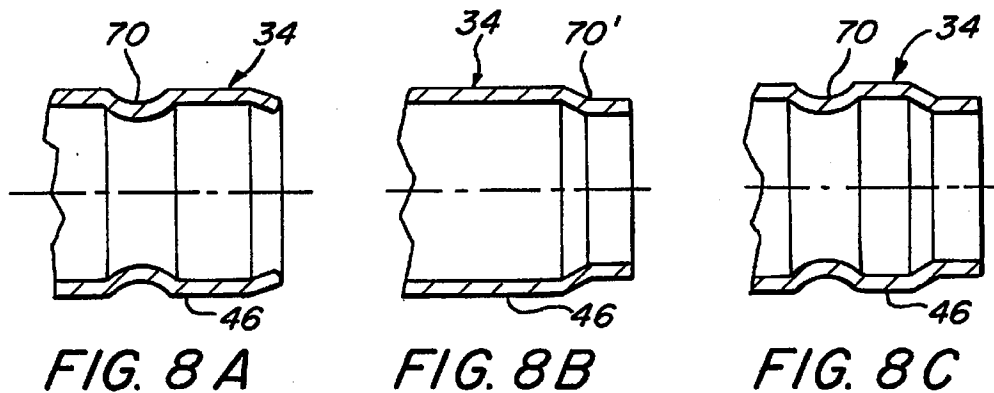
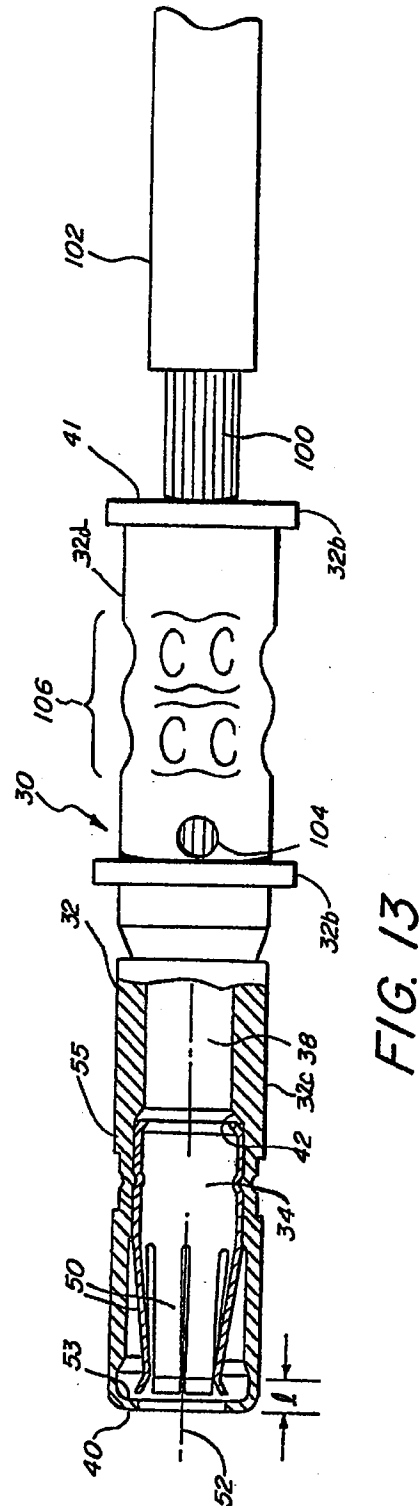
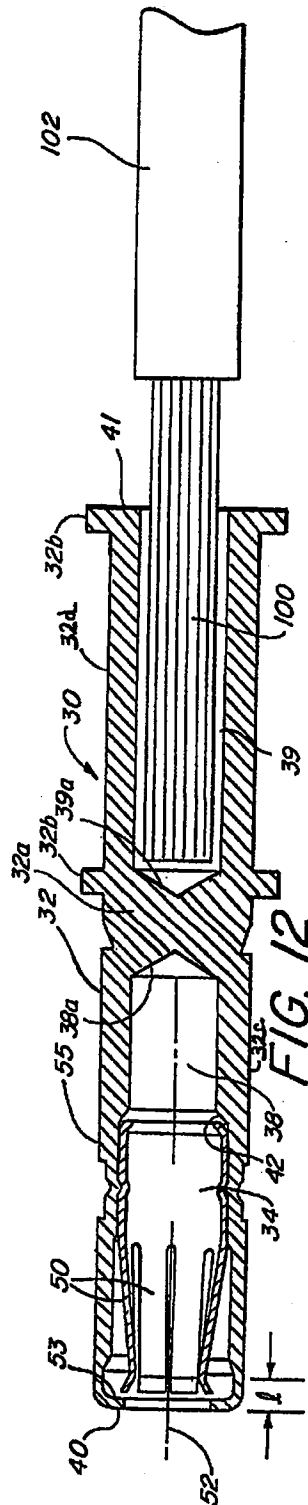
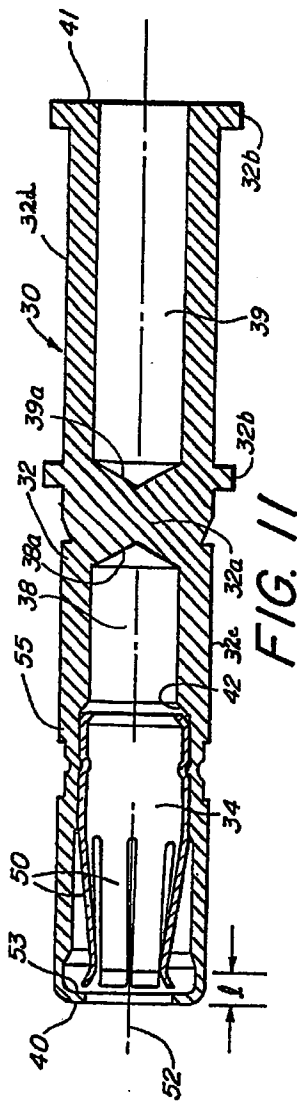


FIG. 4









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## HOODLESS ELECTRICAL SOCKET CONTACT

### RELATED APPLICATION

This application is a continuation-in-part of my application Ser. No. 09/104,733 filed Jun. 25, 1998 entitled Hoodless Electrical Socket Connector which was abandoned on Feb. 4, 2000.

### FIELD OF THE INVENTION

This invention relates generally to electrical contacts, and more particularly, it is directed to a hoodless socket contact and method for making the same.

### BACKGROUND OF THE INVENTION

Electrical contacts are present in all avionics, military and aerospace equipment environment such as in helicopters, missiles and planes. Such equipment may have dozens or even hundreds or even thousands of electrical connections that must be made between electronic power supplies, sensors, activators, circuit boards, bus wiring, wiring harnesses, to provide the electrical pathways or highways needed to transport electricity in the form of control signals and power. The hardware reliability requirements for operating in an avionics environment are stringent as a failure can have catastrophic consequences. As such, the electrical components and circuitry, as well as the connectors and contacts therein employed to electrically connect these items, must work in a wide range and wide variety of environmental conditions such as mechanical, vibration, wide temperature ranges, humidity and corrosive elements, etc. For example, military standards (also known in the industry as mil specs) for aircraft avionics equipment require that contacts be able to mate and unmate a minimum of five hundred times without a failure during all anticipated environmental and mechanical conditions. In addition, the contact assemblies must be protected to withstand repeated handling without significant distortion or damage to the interconnecting parts which could lead to a lack of electrical continuity.

One example of a high-amperage power socket contact or terminal is illustrated in U.S. Pat. No. 5,376,012 "Power Port Terminal" to Clark which includes a contact socket receiving portion and an integral mounting portion. The socket includes a web with a plurality of beams thereon. Each of the beams has a curved surface with a bend, which beams cooperate to form an axially extending tubular socket region which accepts a pin terminal of any desired length. Disadvantageously, the beams are exposed and therefore subject to damage. Additionally, the beams of the socket contact are not protected from entry of an oversize male contact, which may bend the beams beyond their elastic limit thereby damage the connector so that it will not perform electrically.

Another example of a socket contact is illustrated in U.S. Pat. No. 4,906,212 entitled "Electrical Pin and Socket Connector" to Mixon, Jr. which includes a socket have a cylindrical mating portion defined by cantilever beams having one or more blades wherein one or more of the blades include a rearwardly extending free end. The pin includes a mating portion having a bullet nose at one end and a wire barrel at another end. This connector suffers from the same limitations as the Clark connector and therefore is an undesirable alternative in environments where high reliability is critical.

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A prior art female contact which is used in non-critical and in non-aerospace applications is shown in FIG. 1 which contact includes a cylindrical member 10 having holes 12 and 14 in the ends thereof. A spring member 16 is inserted in one of the ends, the spring member tapering rearwardly into the hole 12. Accordingly, a male pin contact inserted into the cylindrical member 10 would be grasped by the spring member 16 relatively deeply within the hole 12 which is disadvantageous. The distance from the free end 15 of the socket to the point of engagement 17 with a male contact or pin is designated by the letter "I" in FIG. 1 (and in FIG. 2). The particular connector halves in which the male and female contacts are used (and the positioning of the connector halves on the equipment, e.g., trays and black boxes) may result in a lesser or greater penetration of the male pins into the socket body. Furthermore, there is no mechanical structure to ensure that the spring member 16 will remain in place and as such the spring may "walk out" of the hole during vibration or during mating and unmating cycles. Mil specs require that a spring member which provides the electrical continuity must be able to withstand the separation force during the unmating cycle (i.e., 500) without being dislodged under all anticipated environmental conditions including vibration. The arrangement of the spring 16 socket member 10 could be potentially hazardous if used in avionics environments where high reliability is a must for human safety.

Another example of a socket contact that is successfully manufactured and sold by the assignee of the present invention is shown in FIG. 2. This contact 20, sometimes referred to as a hooded socket contact, includes a tubular socket body 22 having a plurality of tines 24 for receiving a male contact or pin. A hood 26 is inserted over the tines 24 and rear portion of a contact to protect the tines from damage. The hood is generally made of stainless steel with a wall thickness of only 0.004 to 0.010" for economic and reliability reasons. The hood is press fit over the cylindrical shoulder portion 28 at the rear of the contact. This press fit arrangement, due to the hood's wall thickness, requires precision manufacturing. Improper sizing of the socket body shoulder may result in damage to the hood during the press fit operation or the hood may come loose during use. Plating of the contact may exacerbate the press fit step during manufacturing. Furthermore, a stainless steel hood may not be tolerated in certain applications where interference with magnetic fields is a problem. In summary, the manufacturing steps necessary to insure reliable performance of the hooded type contact shown in FIG. 2 may result in a fairly expensive contact when mass produced.

Accordingly, there is a need for an improved socket contact that is simple to manufacture yet reliable in performance and that can be made in mass quantities at relatively low cost.

### SUMMARY OF THE INVENTION

The foregoing mentioned disadvantages are avoided by providing a hoodless socket or female contact for engaging a male pin contact. The female contact includes a socket body with two ends, each end having an axially oriented hole or bore. A spring for making an electrical connection with a male contact or pin is located in one of the holes. The spring is arranged for resiliently engaging the male pin contact in close proximity to the hole entry point or free end of the socket body. Means are provided for securely holding the spring in the hole, which may be established by a press fit of the spring within the hole coupled with an extension of the socket body overlaying a portion of the spring thereby preventing the spring from exiting from the socket body.



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Alternatively, the spring may be securely coupled in the socket body by crimping the socket body onto the spring. Preferably, this is achieved by crimping a portion of the socket body into a peripheral annular groove in the spring. Barbs on the spring, which engage the inner wall of the hole of the socket body, may also be employed, with or without crimping, to provide additional security.

The hole at the other end of the socket body is sized and shaped to receive a conductor such as a insulated copper wire. The conductor may be electrically and mechanically secured together with the socket body by crimping the socket body onto the conductor.

The construction and operation of preferred embodiments of the contact of the present invention may best be understood by reference to the following description taken in conjunction with the accompanying drawings in which like components or features are designated by the same or primed reference numbers.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side cross-sectional view of a prior art contact;

FIG. 2 is a side cross-sectional view of another prior art contact;

FIG. 3 is a side cross-sectional, partially broken away side view of a socket contact in accordance with the principles of the invention illustrating the two parts of the socket contact prior to assembly;

FIG. 4 is a side cross-sectional, partially broken away side view of the contact parts of FIG. 3 assembled together;

FIG. 5 is a side view of a stamped out spring prior to roll forming;

FIGS. 6A and B are cross-sectional views illustrating a spring made from roll forming ("seam type") or deep drawn ("seamless type") processes, respectively;

FIG. 7 is a side cross-sectional view of the spring with dimples;

FIGS. 8A-C are partial side cross-sectional views of the back end of the spring with optional groove configurations therein;

FIG. 9 is a cross-sectional side view of an assembled socket contact that has been crimped;

FIG. 10 is a cross-sectional view of another assembled socket contact wherein the two parts are assembled together and in addition are also retained by barbs and a pin terminal is inserted into the socket contact;

FIG. 11 is a cross-sectional side view illustrating the two parts of the socket contact prior to assembly with an electrical conductor;

FIG. 12 is a cross-sectional side view of the socket contact with metal stands of an insulated conductor wire inserted into the rear portion of the socket body prior to crimping, and

FIG. 13 is a partially broken away side view of the socket contact with the rear portion of the socket body crimped onto the wire strands.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings and more particularly to FIGS. 3 and 4, there is shown a socket contact generally indicated by reference number 30. The socket contact, sometimes hereinafter referred to as a hoodless socket, is made from two parts including a socket body 32 and a spring 34. The socket body 32 consists of a cylindrically or

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tubularly shaped member 36 having two ends, with an axially disposed male-contact-receiving hole or bore 38 extending from one of the ends 40 (i.e., free end) into the socket body a preselected distance and a conductor or wire receiving hole of bore 39 at the other end 41 thereof. See FIG. 11. The socket body 32 may be made of an electrically conductive material such as a brass/copper alloy. The male-contact-receiving hole 38 may have an inwardly projecting shoulder 42 that provides a back stop for the seating of the spring 34.

The spring 34 contains a forward male contact receiving portion 44 and a rear mounting portion 46. The contact receiving portion 44 includes a plurality of fingers or tines 50. The fingers are arranged around the longitudinal axis 52 of the spring 34 and are separated by gaps or slots 54 between adjacent fingers. Each of the forwardly extending fingers tapers inwardly to define together a tubularly shaped contact region 56 and 58 which engages a male pin inserted 3 therebetween and to provide a reliable electrical connection therebetween under anticipated adverse conditions. The portion of the fingers forward of the contact region 56 bend outwardly to form a flared region 57 which acts as a centralizer for guiding the insertion of a male pin. The tubularly shaped contact region 56 at the bends define a plane curved contact surface which surface may be in radial plane such as the an annular contact surface 58 at a preselected point 60 along a longitudinal axis 52. The preselected point for annular contact surface 58 of the spring 34 is spaced within about 0.020 to 0.045 inches, and preferably about 0.035 inches maximum, from the free end 40 of the socket body when the spring contact is secured therewith, i.e., equals about 0.020" to 0.045" and preferably about 0.035" maximum. The distance from the free end 40 of the socket body to the annular contact surface 58 is designated by the letter " " in FIG. 4. The aforescribed arrangement between the socket body and spring thus allows electrical contact to be made with a male contact close to the end 40 of the socket body. This advantageously provides electrical contact to be made immediately essentially upon coupling a male contact (not shown) to the hoodless female contact 30, as required by the applicable mil specs.

The spring 34' may be of the seam type in which case it is made in a flat configuration, as illustrated in FIG. 5, and then roll formed into the form of a sleeve. A small gap 37 is formed between the edges 51, as shown in FIG. 6A. This gap may visually disappear as a result of the roll formation and press fit steps. Alternatively, the spring 34' may be of the seamless type made, for example, by deep drawing process well known in the art, as shown in FIG. 6B.

While the fingers 50 described hereinabove provide good electrical continuity to a male terminal, increased electrical contact may be established by providing the contact region 56 with inwardly disposed dimples 62, as shown in FIG. 7. While the dimples could be disposed on the same radial plane, preferably the dimples 62 are staggered on the fingers 50, i.e., disposed at different axial distances from the free end of the socket body as shown more particularly in FIG. 5. This advantageously reduces the insertion force needed to insert a male pin between the fingers 50 than when the dimples 62 are all on the same radial plane, while increasing the retention force provided by the fingers 50. Additionally, by staggering the dimples 62, the resonance point of the individual fingers 50 will vary during vibration, thus mitigating open circuit faults. Fingers having different widths "W", as illustrated in FIG. 5, also aid in overcoming the resonance problem encountered with conventional spring contacts. The dimples 62 further assure that a gas-tight



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connection is established between the fingers and a male contact. Such a gas-tight connection seals out corrosive gases and thereby prevents formation of films or corrosives on the surfaces interconnecting the mating male/female contacts that could degrade the electrical conductivity therebetween and cause failures in the connection. It should be noted that dimples or fingers having differing widths may not be necessary in many applications.

The spring 34 may be retained within the hole 38 of the socket body 32 by inserting the contact into the socket body with a press fit configuration and thereafter rolling the free end of the socket body radially inwardly to form an annular shoulder 53 which will engage end 35 of the spring in the event that a sufficient force is applied to the spring tending to pull the spring out of the socket body. See FIG. 4. Alternatively, or in addition thereto, the rear mounting portion 46 of the spring contact may have an annular groove 70 therein, shown with more particularity in FIG. 8A. After assembly, the wall of the socket body 32 may be roll crimped such that a portion 59 of the socket body wall is rolled into the groove 70, as shown in FIG. 9. The rear mounting portion 46 of the spring 34 may have a variety of groove configurations, as shown with more particularity in FIGS. 8A-C.

Another means for retaining the spring in the socket body is shown in FIG. 10. In this embodiment, the rear mounting portion 46 of the spring has a plurality of outwardly extending spring retention bars 80. The bars 80 resiliently compress inward upon insertion of the spring 34 into the hole 38, but dig into the inner wall 38 of the hole to resist removal. As further illustrated in FIG. 10, the pin portion 92 of a male contact 90 is inserted between fingers 50 which spread to resiliently grasp the pin portion 92 via the dimples 62. It should be noted that the dimples 62 are optional.

FIGS. 11-13 illustrate an attachment mechanism for electrically connecting the socket body 32 to an electrical conductor 102, such as a conventional insulated copper wire, for example. The socket body 32 includes a forward (first) tubular portion 32c and a rearward (second) tubular portion 32d separated by a solid center section 32a. The second or rearward portion 32c forms a wire receiving end 41 which opens to a rear hole or blind bore 39 which receives the copper strands 100 of insulated wire 102. The first or forward tubular portion 32c includes the male contact receiving blind bore 38 discussed previously. The front and rear bores 38 and 39 are closed by end walls 38a and 39a, respectively, formed by center section 32a of the socket body. The socket body 32 includes a pair of spaced radially extending shoulders 32b.

As is shown in FIG. 12, the wire strands 100 of the conductor 100 are inserted a predetermined distance into hole 39, which insertion may be aided by a small viewing hole 104 (shown in FIG. 13). The distal end wall 39a of the hole 39, in any event, limits the insertion distance of the wire. A selected portion 106 of the socket body 32, extending over the wire strands 100, is crimped onto the wire strands to make good electrical contact therewith and mechanically hold the wire strands 100 in the socket body 32, as shown in FIG. 13. Advantageously, the socket body while serving to hold and protect the spring also provides for direct attachment to conductor wires and the like without the need for additional parts. It should be noted that while it is preferable to provide separate front (first) and rear (second) holes, 38 and 39, respectively, separated by a center section 32a of the socket body, the hole or bore could be continuous, i.e., one long bore.

There has thus been described an improved contact arrangement which can be cost effective manufactured on a

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repetitive basis. This spring is protected from damage by the socket body. The dimples, when utilized, provide an increased gas tight point(s) of contact, allowing thinner or less noble electrical conductive plating to be used on the fingers. Optionally, staggering the dimples reduces the overall mating and unmating force while maintaining a desired gas tight seal between the fingers and the male contact. Accordingly, various modifications of the hoodless socket, and processes involved in manufacturing the contact terminal, will occur to persons skilled in the art without involving any departure from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A two piece hoodless female contact for engaging a male pin comprising:

a socket body forming one piece of the contact, the socket body having a first tubular portion and a second portion extending along a longitudinal axis, the first portion having an axial hole therein defining an open free male contact receiving end, the second portion having an open wire-receiving end for connection with an electrical conductor; and

a separate spring forming another piece of the contact, the spring being located in the axial hole defining the male contact receiving end of the first tubular portion, the spring including a forward portion and rear portion, the forward portion having a plurality of forwardly and inwardly extending fingers which terminate near the free male contact receiving end of the first tubular portion for resiliently grasping a male pin in close proximity to the free male contact receiving end.

2. The contact defined in claim 1 wherein the socket body further includes a third portion in the form of a solid generally cylindrical section disposed between the first and second portions and wherein each of the fingers includes a male pin engaging surface and wherein the male pin engaging surfaces of the fingers are arranged to grasp the male pin at a distance along the longitudinal axis within a range of about 0.025 to 0.045 inches from the free male contact receiving end of the socket body.

3. The contact defined in claim 2 wherein each of the fingers flare outwardly and forwardly of the respective pin engaging surface thereof for facilitating insertion of the male pin in between the fingers.

4. The contact defined in claim 1 wherein each of the fingers has an inwardly disposed dimple which forms the pin engaging surface for engaging the male pin.

5. The contact defined in claim 4 wherein the dimples are staggered along the lengths of the individual fingers with the dimples being positioned at different axial distances from the free male contact receiving end of the first tubular portion of the socket body.

6. The contact defined in claim 1 wherein the first tubular portion of the socket body is crimped onto the rear portion of the spring.

7. The contact defined in claim 1 wherein the forward portion of the spring terminates axially inwardly of the free male contact receiving end of the first tubular portion of the socket body and wherein the free end of the first tubular portion of the socket body is rolled over to extend radially inwardly beyond the forward portion of the spring to prevent removal of the spring from the hole and to center a mating pin contact.

8. A two piece female contact comprising:

a cylindrically shaped socket body member formed as a single part comprising one piece of the contact, the socket body member having first and second tubular

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portions separated by a solid center portion extending along a longitudinal axis, the first tubular portion defining a first axially disposed blind bore with a free end for receiving a male contact, the second tubular portion defining a second axially disposed blind bore sized and shaped to receive an electrical conductor; and a separate male contact engaging spring forming another piece of the female contact, the spring being seated entirely in the first bore, the spring having front and rear portions, the front portion of the spring having a female coupling portion adjacent to the free end of the first tubular portion of the socket body member and the rear portion of the spring and the first tubular portion of the body member having cooperative securing means for securely holding the spring in fixed position within the body member.

9. The contact defined in claim 8 wherein the first tubular portion of the socket body member defines a tubular wall and wherein the cooperative securing means comprises a selected portion of the tubular wall being roll formed into the rear portion of the spring.

10. The contact defined in claim 8 wherein the first blind bore has an inwardly projecting shoulder, the rear portion of the spring seating against the shoulder to inhibit rearward movement of the spring within the first blind bore of the body.

11. The contact defined in claim 8 further comprising a male pin adapted to be inserted into the front female coupling portion of the spring, the female coupling portion having a plurality of forwardly projecting fingers which are arranged to engage the male pin inserted therebetween in close proximity to the free end of the first blind bore.

12. The contact defined in claim 11 wherein the fingers have male pin engaging surfaces which are arranged to engage the male pin at a distance of within the range of about 0.025 to 0.45 inches from the free end of the first blind bore.

13. A male/female contact system for coupling a male pin contact to a female socket contact, comprising:  
a male pin contact;  
a female socket contact formed in two separate pieces, the first piece being in the form of a tubular socket member having a first blind bore therein with an open free end and having a second blind bore therein sized and shaped for receiving an electrical conductor, the tubular socket member consisting of a single part; and  
the second piece of the female socket contact being a spring member in the form of a sleeve seated in the first blind bore of the tubular socket member and establishing a press fit therein to prevent movement of the spring member relative to the tubular socket member, the spring member having a forwardly extending female coupling portion terminating adjacent the open free end of the first blind bore, said male pin contact being inserted into the open free end and grasped by the female coupling portion.

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14. The male/female contact system defined in claim 13 wherein the tight fit between the socket and spring member is established by burrs on one of the members which dig into the other member.

15. The contact defined in claim 13 wherein the spring member has an indentation and the tubular socket member has a cooperative indentation seated therewith for securely holding the two members together.

16. The contact defined in claim 13 wherein the female coupling portion grasps the male contact at a distance within the range of about 0.025 to 0.045 inches of the open free end of the first blind bore.

17. A method for making a two piece female socket contact comprising the steps of:

forming a sleeve spring member having a rear end and a female coupling portion at a forward end;

forming a separate one piece socket body having first and second tubular portions separated by a solid center section, each of the first and second portions having a wall surrounding a blind bore therein, the blind bore in the first tubular portion having a free open end for receiving the spring member and the blind bore in the second tubular portion adapted to receive a conductor; inserting the spring member entirely within the blind bore in the first tubular portion of the socket body to form a press fit with the female coupling portion being positioned adjacent to the free open end of the blind bore in the first tubular portion;

providing an electrical conductor; and

inserting the electrical conductor into the blind bore in the second tubular portion and crimping the wall of the second tubular portion onto the electrical conductor.

18. The method of claim 17 further comprising the step of:

providing a male contact; and

inserting the male contact into the spring contact female coupling portion establishing an electrical coupling therebetween.

19. The method of claim 17 wherein the female coupling portion of the spring member is formed with a plurality of resilient fingers which are spread apart upon the insertion of a male contact.

20. The method of claim 19 wherein the plurality of resilient fingers of the spring member have a proximal end positioned adjacent the free open end of the blind bore in the first tubular portion of the socket body and further including the step of rolling the wall of the first tubular portion of the socket body adjacent the free open end of the blind bore in the first tubular portion to form an inwardly projecting shoulder which limits the outward movement of the spring member and and inhibits damage to the spring member by an oversize mating male pin.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,250,974 B1  
DATED : June 26, 2001  
INVENTOR(S) : Kerek

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 2,

Line 11, "1" should read -- "l" --.

Column 4,

Line 19, delete "3".

Line 26, delete "an".

Line 35, " ", should read -- "l" --.

Column 6,

Line 18, "alone" should read -- along --.

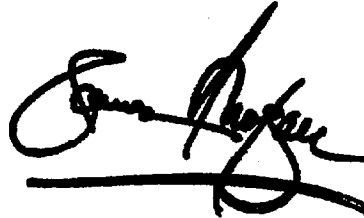
Line 29, delete "free".

Line 31, delete "free".

Signed and Sealed this

Twenty-sixth Day of March, 2002

Attest:

A handwritten signature in black ink, appearing to read "James E. Rogan", with a horizontal line drawn underneath it.

Attesting Officer

JAMES E. ROGAN  
Director of the United States Patent and Trademark Office

# EXHIBIT 5



**TRI-STAR**  
Electronics International, Inc.

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Fax: (310) 536-9322  
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January 25, 2006

Mr. Pierre Lehmann, CEO  
Preci-Dip Durtal SA  
Rue St-Maurice 34  
P.O.Box 341  
CH-2800 Delemont, Switzerland

Subject: Inquiry into Patented Clip Design

Dear, Mr Lehmann

Tri-Star Electronics has recently become aware of Preci-Dip's Mil-Spec contact with "reversed clip technology" Your published literature states:

*"Reversed-clip contacts are presently available in size 12, 16, 20 and 22. this proprietary technology, entirely developed by PRECI-DIP, is protected by international patents."*

Tri-Star Electronics has reviewed a number of your patent filings and believe we have reviewed all that relate to this claim. Tri-Star Electronics has also filed a patent, prior to your reference patent filing, that clearly calls out that our clip is outwardly and forwardly facing. Our patents are enforceable in the United States and Europe.

Does Preci-Dip plan to offer for sales these contacts in either the United States or Europe? If so, we believe Preci-Dip may be in violation of Tri-Star's reverse clip contact design. To avoid any future questions or disputes regarding the Preci-Dip claim, I request that you forward your patent and product samples for our office to review.

Best Regards,

Felix Acosta

Director of Engineering  
Tri-Star Electronics Int'l, Inc.

CC: David Bouzek, VP & General Manager  
Harold Jackson, Patent Attorney



# EXHIBIT 6



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: ) Examiner: J. Nasri

KEREK ) Art Unit: 2839

Serial No.: 09/104,733 )

Filed: 6/25/98 ) April 19, 1999

For: HERMAPHRODITIC ) Tustin, CA

ELECTRICAL CONNECTOR )

AMENDMENT

Assistant Commissioner of Patents  
Washington, D.C. 20231

#5/A  
4/28/99  
Mark

Dear Sir:

In response to the Office Action mailed 1/28/99, please amend the above-mentioned application as follows:

IN THE TITLE

Please amend the title to read --Hoodless Electrical Socket Connector--.

IN THE DRAWING

The drawings were objected to because in figure 9, numeral 57 designating the flared region of the fingers is shown pointing to the socket body. The Examiner is correct. Figures 9 and 10 have been amended as shown in red subject to the Examiner's approval to correct the placement of 57 and to redesignate the crimped portion of the body as 59. The specification has been amended accordingly.

IN THE SPECIFICATION

Page 8, line 28, delete "57" and insert --59--.

IN THE CLAIMS

1. (Amended) A hoodless female contact for engaging a male pin comprising:

a socket body having an axial hole defining an open free end; and

a sleeve-shaped spring located wholly within [in] the hole, including a forward portion and a rear mounting portion, the forward portion having a plurality of forwardly and inwardly projecting fingers which terminate near the free end for resiliently grasping the male pin in close

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cont 01  
proximity to the free end and the rear mounting  
portion seated in the axial hole adjacent the  
socket body.

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1 9. (Amended) A female contact comprising:

a tubularly shaped body member having an  
[having an] having a wall defining an axially  
disposed bore with a free end; and

93 5 a spring seated wholly within [in] the bore,  
the spring having front and rear portions, the  
front portion having a female coupling portion  
adjacent to the free end, and the rear portion  
having at least one indentation therein with a  
10 cooperative portion of the tubularly shaped wall of  
the body member seated in the indentation to  
securely hold the spring in fixed position within  
the body.

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1 14. (Amended) A male/female contact system for coupling

a male pin contact to a female socket contact, comprising:

a tubular socket member having a first end  
with a hole therein;

93 5 a pin contact; and

a tubular spring member seated wholly within  
[in] the hole of the tubular socket member  
establishing a tight fit therein to prevent  
movement of the spring member relative to the  
10 tubular socket member, the spring member having a  
forward extending female coupling portion  
terminating adjacent the first end, the male pin  
being inserted into and grasped by the female  
coupling portion.

---

94 1 18. (Amended) A method for making a female socket  
contact comprising the steps of:



providing a tubular spring member having an annular grooved portion at a rear end and a female coupling portion at a forward end;

providing a socket body with a bore having a free end;

inserting the spring member in the socket body with the female coupling portion adjacent to the free end and the rear end located wholly within the bore; and

crimping the socket body onto the spring member to push a portion of the socket body into the grooved portion of the rear end of the spring member to hold the two together.

21. (Amended) A method for making a tubular spring member for insertion into a socket body to form a female contact comprising the steps of:

providing a flat sheet of electrically conductive material;

forming in the flat sheet a plurality of spaced apart, essentially parallel elongated fingers; and

roll forming the flat sheet into a cylindrically shaped sleeve having an axis wherein the finger tapers inwardly along the axis forming a forward resilient tubularly shaped contact region and a rear tubularly shaped mounting portion.

25. (Amended) A method of making a hoodless socket contact comprising the steps of:

providing a flat sheet of electrically conductive material;

forming in the flat sheet a plurality of spaced apart, essentially parallel elongated fingers;

roll forming the flat sheet into a  
cylindrically shaped sleeve having an axis wherein  
10 the finger taper inwardly along the axis forming a  
resilient tubularly shaped contact region and a  
cylindrically shaped rear portion; and  
providing a tubularly shaped body member having a  
bore defining an inner wall with a free end and  
15 inserting the cylindrically shaped sleeve into the  
bore so that the tubularly shaped contact region is  
disposed adjacent the free end and the  
cylindrically shaped rear portion seats wholly  
within the bore in resilient engagement with the  
20 inner wall.

REMARKS

Reconsideration of this patent application is requested  
in view of the above amendments and following remarks.

In the Office Action, the Title of the application was  
objected to as not being descriptive. Applicant has provided  
a new title which is believed to be descriptive of the  
invention removing the ground for this objection.

The drawings were objected to because in figure 9  
numeral 57 designates the socket body and not the flared  
region of the fingers as stated in specification page 6, line  
31. This has been corrected.

In the Office Action, claim 9 was objected to with the  
suggestion that the words "having an" be deleted from line 2.  
Claim 9 has been amended deleting "having an" after "member".

Claims 1 and 14 were rejected under 35 USC 102(b) as  
being clearly anticipated by Drogo. Additionally, claims  
2-13 and 15-26 were rejected under 35 USC 103(a) as being  
unpatentable over Drogo in view of Trafton, Sawada, Maki,  
Sakuai and admitted prior art per specification page 7, line  
20.

Claims 1, 9, 14, 18, 21 and 25 have been amended to more fully patentably distinguish over the references individually or taken together.

For example, claim 1 now recites a hoodless female connector having a socket body with an axial hole defining an open free end and a sleeve-shaped spring located wholly within the hole, including a forward portion and a rear mounting portion. The forward portion is defined as having a plurality of forwardly and inwardly projecting fingers which terminate near the free end for resiliently grasping the male pin in close proximity to the free end and the rear mounting portion seated in the axial hole against the socket body. The amendment clarifies that the sleeve-shaped spring seats entirely within the socket body.

Drogo discloses nothing remotely similar to Applicant's claimed hoodless contact invention. Drogo instead discloses the standard hooded connector. As stated in Drogo, "Fig. 1 shows a protection sleeve 11 which, once the electrical connection [is] assembled, surrounds coaxially tongues 8a-8c and abuts at both ends between flange 5 of spindle 1 and shoulder 10 of jack 2." Jack 2 comprises a tubular part 6 for receiving the uninsulated end of a wire and extended by a cylindrical solid part 7, the end of which is solid with three resilient tongues 8a-8c. Accordingly, Drogo's "hooded" arrangement using protection sleeve 11 is really the same as the prior art conventional socket contact described in Fig. 2 in Applicant's application. Both of these prior art contacts have a thin wall hood or protection sleeve that seats over a plurality of tines.

Applicant's female connector is structurally and functionally vastly different from Drogo's disclosed connector. Applicant's connector has a sleeve-shaped spring,

which is located entirely within the body of the female socket. No separate hood, like the protection sleeve 11 in Drogo, is used in Applicant's claimed arrangement. The thin wall hood 11 in Drogo must rely on a press fit to stay mated with the extended cylindrical solid part 7. Accordingly, the sleeve and the press fit must be precisely manufactured which is time consuming and expensive. Improper dimensional sizing could cause the hood to easily slide off or make it difficult to push the sleeve over the cylindrical solid cylindrical part 7 possibly damaging either the sleeve or the tines. Such a hood is inherently unreliable in situations where the connector must work in a wide range and wide variety of environmental conditions such as mechanical vibration, temperature ranges, humidity and corrosive elements. The hooded arrangement in Drogo could not easily be repetitively made to reliably to operate in such circumstances.

The other independent claims 9, 14, 18, 21 and 25 similar to claim 1, recite a spring arrangements located within a female socket body. Advantageously, in all these claimed arrangements, the female socket body itself protects the spring from damage. The spring may be very simple, with a forward portion having grasping fingers and a short rear mounting portion for seating adjacent the inner wall of the female socket body. Drogo in no way discloses such an arrangement.

The other references cited in the Office Action, namely Trafton, Sawada, Sakurai and Maki add nothing to Drogo to render Applicant's invention obvious.

Trafton discloses a female electrical connector including a housing 12 defining a bore and a contact cage disposed within the housing. The contact cage includes a number of contact blades 19, which sit against the inside

bore wall of the housing. As stated in Trafton: "each contact blade 19 includes a contact point 24 defined thereon by portion of the blade 19 which is bent so as to project radially inward with regard to the right cylinder contact portion." A male pin is inserted through the rear of the housing to make contact with the bends in the blades. This disclosed structure is entirely different than Applicant's simple arrangement in which the spring includes forwardly and inwardly extending fingers which terminate near the open end of the socket body such that a male pin is grasped in close proximity to the open end. This advantageously provides good electrical contact to be made essentially immediately upon coupling the male contact to the hoodless female contact.

The connector in Trafton further includes a retainer 26 having a frusto-conical surface corresponding to the frusto-conical base portion of the contact cage 16. This retainer 26 functions to bias the base portion 20 of the contact cage 16 into engagement, and electrical communication with the housing 12. This retaining arrangement is much more complex than Applicant's socket and spring, wherein the spring may be retained in the socket by press fitting, a cooperative groove arrangement, or retaining burrs, for example. Additionally while simple dimples may be added to the fingers or tines of Applicant's spring, in Trafton "each contact blade 19 includes a contact pivot point 24 defined thereon by portion of the blade 19 which is bent so as to project radially inward with regard to the right cylinder contact portion 18." Trafton therefore bends this entire blade. This is quite different than Applicant's simple dimple arrangement and Trafton in no way discloses or suggests this arrangement.

Sawada, similar to Trafton, discloses a hooded contact arrangement including a protective sleeve 6 protecting elastic contact pieces 2. As shown in Fig. 1, Sawada discloses a terminal body 10 with elastic contact pieces 12, cylindrical base portion 13 for seating the protective sleeve 6, conductor clamping portion 14 extending rearwardly from the base portion 13 and a wire clamping portion 15. This conventional pig-tail terminal connector arrangement adds nothing to render Applicant's claimed invention obvious and has all the disadvantages of Drogo and Prior Art Figure 2.

Sakurai discloses yet another hooded female contact, including a protective sleeve 30 for protectively covering the female receptacle section 21 of the female terminal member 20. Accordingly, Sakurai adds nothing to render Applicants claimed invention obvious.

Maki, again consistent with the prior art hooded female contacts, discloses a terminal body 1 with a protective cover 2 slid over the terminal body.

All these references disclose similar generic hooded pig-tail terminal contacts well known in the art and such pervasive structures really teach and lead one away from applicant's novel socket and spring approach.

Additionally, no reference discloses the claimed feature that Applicant's fingers grasp the male pin about .025 to .050 inches from the free end of a socket body. Further there is no disclosure in any of the references teaching the unique crimping method and structure for holding the rear portion of the spring snugly within the socket body.

For all the foregoing reason, it is felt that claims 1, 9, 14, 18, 21 and 25 patentable distinguish over the cited references. Additionally, the dependant claims to these independent claims, namely, 2-8, 10-13, 15-17, 22-24 and 26,


which claim additional features not disclosed in the references, also patentably distinguish over the cited references. Accordingly, it is respectfully requested that 1-26 be allowed and that this application be passed to issue at an early date.

The application is now believed to be in condition for allowance and such action is courteously solicited.

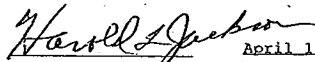
If applicants' attorney can be of any assistance in this matter, please call the undersigned at the number provided.

Respectfully Submitted,

JACKSON LAW CORPORATION

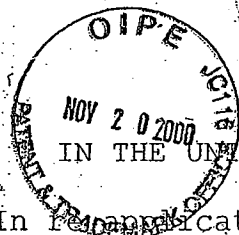
  
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:  
Assistant Commissioner of Patents  
Washington, D.C. 20231 on April 19, 1999

  
April 19, 1999  
Harold L. Jackson  
Reg. No. 17,766

# EXHIBIT 7





PATENT  
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In reapplication of: ) Examiner: J. Nasri  
KEREK ) Art Unit: 2839  
Serial No.: 09/395,515 )  
Filed: 9/14/99 ) November 17, 2000  
For: HOODLESS ELECTRICAL ) Tustin, California  
SOCKET CONTACT )

AMENDMENT

Assistant Commissioner of  
Patents  
Washington, D.C. 20231

Dear Sir:

In response to the Office Action dated July 17,  
2000, kindly amend the above-mentioned application as  
follows:

IN THE SPECIFICATION

Page 1, line 15, after "Connector" and before the  
"." insert - - which was abandoned on February 24, 2000 - -

Page 9, line 15, after "define" insert - - a plane  
curved contact surface which surface may be in radial  
plane such as the - -.

Page 9, line 17, after "along" insert - - a  
longitudinal - - and delete "the".

# 4/A  
Amend  
Bell  
12-6-00

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Page 9, line 24, after " maximum." insert - - The distance from the free end 40 of the socket body to the annular contact surface 58 is designated by the letter " " in Figure 4 - -.

Page 12, line 19, after "body" insert - - 32c includes a forward (first) tubular portion 32c and a rearward (second) tubular portion 32d separated by a solid center section 32a. The second or rearward portion 32c forms a - - .

Page 12, line 20, after "41" insert - - which - - .

Page 12, line 22, after "102." insert - - The first or forward tubular portion 32c includes the male contact receiving blind bore 38 discussed previously. - -

#### IN THE CLAIMS

1. (Amended) A two piece hoodless female contact for engaging a male pin comprising:

a socket body forming one piece of the contact, the socket body having a first tubular portion and a second portion extending along a longitudinal axis, the first portion having [two ends with at least one] an axial hole, therein defining an open free male contact receiving end, the second portion having [and] an open wire-receiving end for

connection with an electrical conductor; and  
 a separate spring forming another piece  
of the contact, the spring being located in  
 the axial hole defining the male contact  
 receiving end of the first tubular portion,  
 the spring including a forward portion and  
 rear portion, the forward portion having a  
 plurality of forwardly and inwardly extending  
 fingers which terminate near the free male  
 contact receiving end of the first tubular  
portion for resiliently grasping the male pin  
 in close proximity to the free male contact  
receiving end.

2. (Amended) The contact defined in claim 1  
 wherein the socket body further includes a third portion  
in the form of a solid generally cylindrical section  
disposed between the first and second portions and  
wherein each of the fingers includes a male pin engaging  
surface and wherein the male pin engaging surfaces of the  
fingers are arranged to grasp the male pin at a distance  
along the longitudinal axis within a range of about .025  
to .045 inches from the free male contact receiving end  
of the socket body.

1 3. (Amended) The contact defined in claim 2  
 wherein each of the fingers flare outwardly and forwardly  
of the respective pin engaging surface thereof [out at  
 the ends thereof] for facilitating insertion of the male  
 5 pin in between the fingers.

1 4. (Amended) The contact defined in claim 1  
 wherein each of the fingers has an inwardly disposed  
 dimple which forms the pin engaging surface for engaging  
 [engage] the male pin.

1 5. (Amended) The contact defined in claim 4  
 wherein the dimples are staggered [disposed] along the  
 [extent] lengths of the individual fingers with the  
dimples being positioned at different axial distances  
 5 from the free male contact receiving end of the first  
tubular portion of the socket body.

Please cancel claim 6 without prejudice.

1 6. (Amended) The contact defined in claim 1  
 wherein the first tubular portion of the socket body is  
 crimped onto the rear portion of the spring [contact].

1 7. (Amended) The contact defined in claim 1  
 wherein the forward portion of the spring terminates  
axially inwardly of the free male contact receiving end  
of the first tubular portion of the socket body and  
 5 wherein the free end of the first tubular portion of the  
socket body is rolled over to extend radially inwardly

beyond the forward portion [end] of the spring to prevent removal of the spring from the hole and to center a mating pin contact.

1 8. (Amended) A two piece female contact comprising:

3  
3 5  
A7  
Cant

a [tubularly] cylindrically shaped body <sup>socket</sup> member formed as a single part comprising one <sup>socket</sup> piece of the contact, the body member having first and second tubular portions separated by a solid center portion extending along a longitudinal axis, the first tubular portion defining a first axially disposed blind bore with a free end for receiving a male contact, the second tubular portion defining [and] a second axially disposed blind bore sized and shaped to receive an electrical conductor; and

10 a separate male contact engaging spring <sup>female</sup> forming another piece of the contact, the spring being seated entirely in the first bore, the spring having front and rear portions, the front portion of the spring having a female coupling portion adjacent to

15 the free end of the first tubular portion of the socket body member and the rear portion of the spring and the first tubular portion of

20

the body member [socket body] having cooperative securing means for securely holding the spring in fixed position within the body member.

17  
end  
9.  
10. (Amended) The contact defined in claim 8 wherein the first tubular portion of the socket body member defines a tubular wall and wherein the cooperative securing means comprises a selected portion of the [tubularly shaped] tubular wall being roll formed into the rear portion of the spring.

Claim 11, line 5, after "the" (second occurrence) insert - - first blind - -.

11-12. (Amended) The contact defined in claim 8 further comprising a male pin adapted to be inserted into the front female coupling portion of the spring, the female coupling portion having a plurality of forwardly projecting fingers which are arranged to engage the male pin inserted therebetween in close proximity to the free end of the first blind bore [socket body].

12-13. (Amended) The contact defined in claim 12 wherein the fingers have male pin engaging surfaces which are arranged to engage the male pin at a distance of within the range of about .025 to 0.45



5 inches from the free end of the first blind bore  
[tubularly shaped member].

1 ~~B.14.~~ (Amended) A male/female contact system  
for coupling a male pin contact to a female socket  
contact, comprising:

a male pin contact;

5 a female socket contact formed in two  
separate pieces, the first piece being in the  
form of a tubular socket member having a first  
[hole] blind bore therein with an open free  
end [for receiving the male pin contact] and  
10 having a second blind bore [hole] therein  
sized and shaped for receiving an electrical  
conductor, the tubular socket member  
consisting of a single part; and

[a pin contact; and]

15 the second piece of the female socket  
contact being a [tubular] spring member in the  
form of a sleeve seated in the first [hole]  
blind bore of the tubular socket member and  
establishing a [tight] press fit therein to  
20 prevent movement of the spring member relative  
to the tubular socket member, the spring  
member having a forwardly extending female  
coupling portion terminating adjacent the open

free end of the first blind bore, said [hole, the] male pin contact being inserted into the open free end and grasped by the female coupling portion.

Claim 15, line 3, delete "members" and insert therefore - -member- -.

1. ~~16-17~~ (Amended) The contact defined in claim ~~14~~ <sup>13</sup> wherein the female coupling portion grasps the male contact at a distance within the range of about .025 to .045 inches of the [first] open free end of the first blind bore.

1. ~~17-18~~ (Amended) A method for making a two piece female socket contact comprising the steps of:

[providing a tubular] forming a sleeve spring member having a rear end and a female coupling portion at a forward end;

[providing] forming a separate one piece socket body having first and second tubular portions separated by a solid center section, each of the first and second portions having a wall surrounding a blind bore therein, the blind bore in the first tubular portion [with bore] having [a wall,] a free open end for receiving the spring member and the blind bore in the second tubular portion adapted to



15 receive a conductor [a conductor receiving  
end];

inserting the spring member entirely  
within the blind bore in the first tubular  
portion of the socket body to form a press fit  
20 with the female coupling portion being  
positioned adjacent to the free open end of  
the blind bore in the first tubular portion;

[crimping the socket body wall onto the  
spring member to push a portion of the socket  
body wall into the spring member to hold the  
25 two together];

providing an electrical conductor; and  
inserting the electrical conductor into  
the blind bore in the second tubular portion  
30 and crimping the wall of the second tubular  
portion onto the electrical conductor [socket  
body at the conductor receiving end]; ~~and~~ <sup>therefore</sup>

crimping the socket body wall onto the  
conductor].

1 <sup>18</sup> ~~18~~ (Amended) The method of claim <sup>17</sup> ~~18~~ further  
comprising the step of:

providing a male contact; and

5 inserting the male contact into the  
spring contact female coupling portion

establishing an electrical coupling therebetween.

19' 20. (Amended) The method of claim 18<sup>17</sup> [19] wherein the [spring member is formed with a] female coupling portion of the spring member is formed with a [in the form of a] plurality of resilient fingers which are spread apart upon the insertion of a [the] male contact.

21. (Amended) The method of claim 20<sup>19</sup> wherein the plurality of resilient fingers of the spring member have a proximal end positioned adjacent the free open end of the blind bore in the first tubular portion [spring receiving end] of the socket body [bore] and further including the step of rolling the wall of the first tubular portion of the socket body adjacent the free open end of the blind bore in the first tubular portion [spring member receiving end] to form an inwardly projecting shoulder which limits the outward movement of the spring member and [proximal end of the resilient fingers to thereby] and inhibits damage to the spring member by an oversize mating male pin.

REMARKS

Reconsideration of the above-mentioned application is respectfully requested.

The specification has been amended on page 1 to state that the patent application was abandoned on February 24, 2000 as suggested in the Office Action. Page 9 of the specification has been amended on line 15 to point out that the contact region at the bends of the spring contact fingers define "a plane contact surface which surface may be in the radial plane" such as the annular contact surface 58 shown in Fig. 3. Page 9 has also been amended to point out that the distance from the free end 40 of the socket body to the annular contact surface 58 is designated by the letter "l". Fig. 4 has been amended to add the reference numeral 58, (which is also shown in Fig. 3), to designate the contact surface (subject to the Examiner's approval) and a copy of this figure with the proposed change in red is enclosed. Page 12 of the specification has been amended (and the drawings) to identify the three portions of the socket body 30, i.e., a forward or first tubular portion 32c and a rearward or second tubular portion 32d separated by a solid center section. Figures 11-13 have also been amended, subject to the Examiner's approval, to add reference numerals 32c and 32d to identify the first and

second tubular portions of the socket body. A copy of Figs. 11-13 is enclosed with the added numerals in red.

The distance " $\ell$ ", shown in Fig. 4 as well as Figs. 1, 2, and 11-13, represents the distance from the free end of the socket body that the fingers engage or grasp the male pin. The specification points out that this distance " $\ell$ " can vary within the range of about .020 to .045 inches. This claimed feature is clearly shown in the drawings.

The Examiner's objections to claim 6 has been overcome by appropriate amendment.

#### REJECTION BASED ON 35 U.S.C. §112

The rejection of claims 2, 3, 5 and 7-21 based on 35 U.S.C. §112 has also been obviated by appropriate amendment of the claims. For example, the Examiner noted that in claims 2, 13 and 17 it is not clear what is meant by "the fingers grasp the male pin about .025 to .045 inches from the free end of the socket body."

Claims 2 and 13 have been amended to point out each of the fingers have or include a male pin engaging surface and that the male pin engaging surfaces are arranged to grasp or engage the male pin at a distance within a range of about .025 to .045 inches from the free end of the socket body or first blind bore. The distance designated " $\ell$ " in the drawings, between the free male

A

pin receiving end of the socket body and the location of the contact between the pin engaging surfaces of the spring fingers and the male pin is clear. Claim 17 has been amended in a similar fashion. Claims 2, 13 and 17 are now definite and in compliance with §112.

Claim 3 has been amended to call for each of the spring fingers to flare outwardly and forwardly of the pin engaging surfaces thereof. Claim 3 is now definite.

Claim 5 has been amended to call for the dimples to be staggered along the lengths of the individual fingers with the dimples being positioned at different axial distances from the free end of the first tubular portion of the socket body. The staggering of the dimples results in the positioning of the dimples at different axial distances from the free end of the first tubular portion of the socket body when the spring and socket body are assembled. Claim 5 is now believed to be definite.

Claim 7 has been amended to delete the word "contact" after "spring" and is now definite. Claim 8 was objected to as being confusing and in not providing an antecedent for the forward end of the spring. This claim has been amended to call for the forward portion of the spring to terminate axially inwardly (i.e., inwardly along the longitudinal axis 52) of the free male contact

A

receiving end of the first tubular portion of the socket body with the free end of the first tubular socket body portion being rolled over to extend radially inwardly beyond the forward portion of the spring. Claim 8 is now believed to clearly definitely define the invention in compliance with §112.

Claim 10 has been amended to positively call for the first tubular portion of the socket body member to define a tubular wall and this claim is now definite.

Claim 11 has been amended to clarify the bore being referred to. Claim 14 has been amended to point out that there is only one pin contact, i.e., a male pin contact.

Claim 18 was objected to as being indefinite and has been amended to overcome the insufficient antecedent problem.

Claim 20 has been amended to remove the redundancy and is now definite.

Claim 21 has been amended to call for the spring member and is now definite.

#### PRIOR ART REJECTION

The rejection of claims 1-3 and 6-9 in the Office Action, as being anticipated by Wymelenberg, is traversed. The Wymelenberg reference discloses a one-piece contact which is roll formed from a single flat metal blank. The end result is a split outer sleeve



forward portion with an elongated opening between the edges 21, a pair of contact arms folded inside the split sleeve, and a rearward portion in the form of crimp wings for attachment to an electrical conductor. In contrast, applicant's novel hoodless socket contact is a two-piece contact comprising a socket body with a forward tubular portion, a rearward portion, preferably also tubular, for receiving an electrical conductor and a center section, also preferably solid, separating the forward and rear portions. The second piece of the contact is a separate sleeve spring member positioned in the forward tubular portion of the socket body. The spring member may be secured in the forward socket body portion by, for example, a press fit or by crimping the forward tubular portion onto the spring member. Wymelenberg does not crimp the outer shell of his one-piece contact over the strips C which form the contact arms.

The advantages of applicant's novel two-piece hoodless socket over the Wymelenberg are many. First, the Wymelenberg one-piece socket terminal would never meet Mil Spec requirements because of the open gap along the outer sleeve. In addition, Mil Specs C-39029 and C-2250 require that the electrical conductor receiving end of the contact be capable of being crimped over the conductor with specified crimping tools. The Wymelenberg

terminal does not have a rearward tubular portion, i.e., cylindrical wire barrel. Instead it has crimp wings at the wire connection which would not meet the specifications.

Applicant's two-piece hoodless socket allows the same size of spring member to be used with different kinds of socket bodies to accommodate a great variety of connector applications, such as circular, Arinc, miniature, front and rear release connectors, etc. See Ex. A attached hereto.

In addition, applicant's two-piece construction is compatible with optimum annealing effectiveness.

For the best crimpability, after cold work, the wire barrels need to be annealed to release the stress, or to become a little bit soft after being heat-treated. During the process, it could happen that the parts are over-annealed or annealed at the wrong end.

Because applicant's hoodless contact is of a two-piece construction, the spring members do not need thorough annealing. Therefore softening the spring due to over-annealing the barrel is not a concern.

Wymelenberg's terminal is one a one-piece construction. If over-annealing the crimp end, the other end of the spring member could be weakened due to the heat easily transferred through a tiny metal piece.



Apart from the advantages of applicant's invention, the claims, as amended, clearly distinguish over Wymelenberg. Claim 1 calls for a two-piece contact comprising a socket body with a first (or forward) tubular portion with an axial hole therein and a second portion having an open wire receiving end for connection to a wire conductor. A separate spring forms the second piece of the contact. As pointed out previously, Wymelenberg does not disclose a two-piece contact. Also, Wymelenberg does not disclose a forward tubular portion, but instead a split sleeve with its disadvantages, i.e., unable to meet relevant specifications in the Aerospace and Defense Industries. Claim 1 is clearly patentable over Wymelenberg.

Claim 2, also distinguishes over Wymelenberg, in calling for the socket body to include a third portion in the form of a solid generally cylindrical section disposed between the first and second portions. In addition, Wymelenberg is silent on the distance from the free end of the socket body that the spring pin engaging surface engage the male pin and therefore does not teach or suggest this important limitation. Claims 3 and 8 are patentable over Wymelenberg for the reasons advanced with respect to claims 1 and 2.

Claim 7 calls for the first tubular portion of the socket body to be crimped onto the spring. As discussed previously, the outer shell of the Wymelenberg contact is not crimped over the contact arms C. Indeed with a one-piece construction there is no need to prevent separation of contact arms from the rest of the contact. Claim 7 is patentable.

Amended claim 9 calls for a two-piece female contact with one-piece being in the form of a cylindrically shaped body member having first and second tubular portions separated by a solid center portion with each of the first and second portions defining a blind bore therein. Wymelenberg discloses a one-piece contact which would be unacceptable for Aerospace and Defense Industry applications for the reasons pointed out above. Furthermore, neither section (16 or 14) of the Wymelenberg reference defines a blind bore. Claim 9 is patentable over Wymelenberg.

Claims 9-11, 14 and 17-19 were rejected as anticipated by Nestor et al. This reference teaches a four-piece connector and is clearly less relevant than the prior art referenced to in the background section of this application.

Applicant agrees that Nestor et al discloses a socket which includes a tubular body member, i.e., cup

portion 28, which defines a first blind bore and a rear stem portion 29. The stem 29, however, is externally threaded and does not define a blind bore. The embodiment shown in Figs. 7 and 8 of Nestor et al also does not have a second tubular portion which defines a blind bore, but instead discloses tabs (part of item 140) which are bent over the conductor. A contact relying on such tabs would not meet Mil Spec requirements as discussed previously. In the Nestor et al connector a male contact engaging spring 16 (wrapped around the rear portion of the sleeve 12) fits partially within the cup 28. A hood 30 fits over the spring and sleeve 12 to complete the assembly. The hood 30 functions much like the hood 26 of the prior art device shown in Fig. 2 of this application. The Wymelenberg terminal and the Nestor et al connector were apparently designed for automotive applications where once a connection is made it will remain in that condition for a long period of time, e.g., until the next maintenance or overhaul period. Contacts for aerospace and defense applications per military specs must be capable of mating and unmating hundreds of times.

The Nestor et al connector has many shortcomings in comparison to applicant's invention with cost being an obvious one.

Claim 9 clearly distinguishes over Nestor et al in calling for a two-piece socket contact with a socket body formed of a single part comprising one of the pieces and a spring member forming the other piece of the contact. In addition, the second tubular portion defines a blind bore for receiving an electrical conductor. Even if one treats the cup 28 and the separate hood or ring 30 of Nestor et al as a socket body member, the body member is not formed of a single part. Claim 9 is patentable over Nestor et al.

With respect to claim 10, Nestor et al does not teach roll forming the tubular wall of the socket body into the rear portion of any spring. Claim 11 calls for the first blind bore to have an inwardly projecting shoulder against which the rear portion of the spring is seated. It is not believed that the back interior wall of the cup 28 can be considered to be as a shoulder and even if it is the other elements of claim 11 as set forth in claim 9 are missing from Nestor et al.

With respect to claim 14 the female contact is defined as being formed of only two-pieces with the tubular socket member consisting of a single part. The Nestor et al support member 14 consists of two parts, i.e., items 28 and 30, with a third part, i.e., the sleeve 12 holding the metal cylinder 16 in place within the

member 14. The claimed single part socket member as well as the second blind bore is missing from the four piece Nestor et al connector. Claim 14 is patentable.

While it is not conceded that structure providing distances called for in claim 17 is met by Nestor et al, this claim is patentable from the reasons advanced with respect to claim 14.

With respect to amended claim 18 it is not clear how Nestor et al can be construed to teach the forming of a sleeve spring member with a female coupling portion at a forward end. It would seem that the female coupling portion of Nestor et al item 16 extends the length of the item. Nevertheless, Nestor et al clearly does not teach forming a separate one-piece socket body with blind bores at each end. While Nestor et al teaches inserting the spring item 16 into the blind bore in the cup 28, it is not inserted entirely within that bore. Instead the hood 30 must then be inserted over the overhanging end of the item 16 after the ends thereof have been bent around the sleeve 12. Additionally there is no crimping of the wall of any second blind bore onto an electrical conductor in the Nestor et al patent. Claim 18 is patentable. Claim 19 is patentable for the reasons advanced with respect to claim 18.

A

Claims 12 and 13 are patentable over Wymelenberg for the reasons advanced with respect to claims 9 and 2.

Method claim 18, rejected as anticipated by Wymelenberg, calls for forming a sleeve spring member and a separate one-piece socket body with first and second tubular portions separated by a solid center section with blind bores (surrounded by walls) in each of the tubular portions. Wymelenberg does not teach forming two separate pieces or even a socket body with a solid center section. Claim 18 further calls for the step of inserting the spring member within the blind bore in the first tubular section and inserting a conductor into the blind bore in the second tubular section and crimping the wall surrounding that blind bore onto the electrical conductor. The method of claim 18 is completely different than the method taught by Wymelenberg and produces a superior hoodless socket contact especially useful in Aerospace and Military Applications.

Claims 19-21 are also patentable over Wymelenberg for the reasons advanced above.

The rejection of claims 1, 4 and 5 as being unpatentable over Wymelenberg in view of Trafton is respectfully traversed. To add the staggered dimples of Trafton to Wymelenberg would still result in a one-piece contact with its many shortcomings discussed previously.

Furthermore, Trafton teaches away from applicant's invention in which the spring fingers engage the male pin in close proximity to the free male contact receiving end of the socket body.

Claims 1, 4 and 5 are patentable over Wymelenberg in view of Trafton.

Claims 14-16 were rejected as unpatentable over Nestor et al in view of Sakurai. While Sakurai does show means such as the stopper arms 40 to prevent dislodgment of the female terminal from the housing, combining the teachings of this reference with Nestor et al would not result in applicant's invention as called for in claims 14-16. As pointed out previously (pages 18-20) the combined connector would still be formed of four separate pieces with no blind bore for receiving the electrical connector. Claims 14-16 are patentable over Nestor et al in view of Sakurai.

Applicant has developed a two-piece socket contact which not only meets the relevant military specifications essential for the Aerospace and Defense Industry, but provides a significant cost savings to users by eliminating a conventional precision hood with its attendant shortcomings (see pages 4-5 of the application) while at the same time reducing inventory requirements



since the spring can be used with many different types of socket bodies (see Ex. A).

Applicant has solved an important problem, made a significant contribution to this art and is entitled to the protection afforded by the claims now in this application which claims clearly distinguish the prior art.

This application is now believed to be in condition for allowance and such action is courteously solicited. If applicant's attorney can be of any further assistance please call the undersigned at the number provided.

Respectfully submitted,

JACKSON LAW CORPORATION



Harold L. Jackson

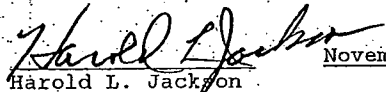
Reg. No. 17,766

14751 Plaza Dr., Ste. N

Tustin, CA 92780

(714) 832-2080

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:  
Assistant Commissioner of Patents  
Washington, D.C. 20231 on November 17, 2000



Harold L. Jackson  
Reg. No. 17,766

November 17, 2000



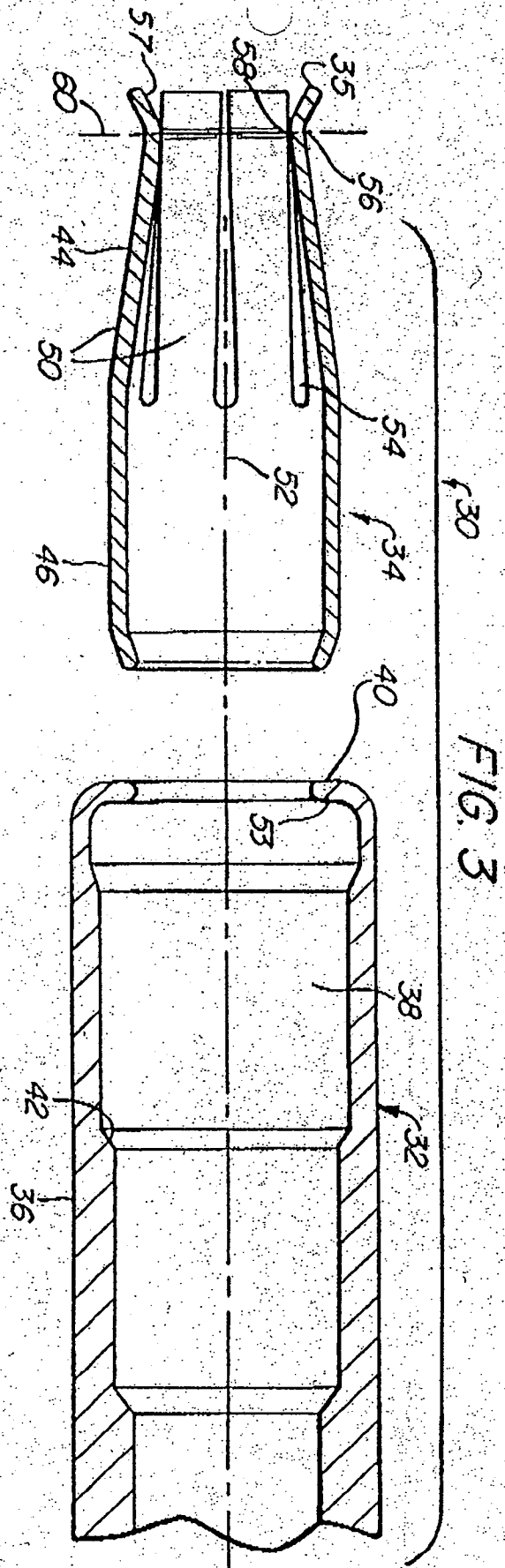


FIG. 3

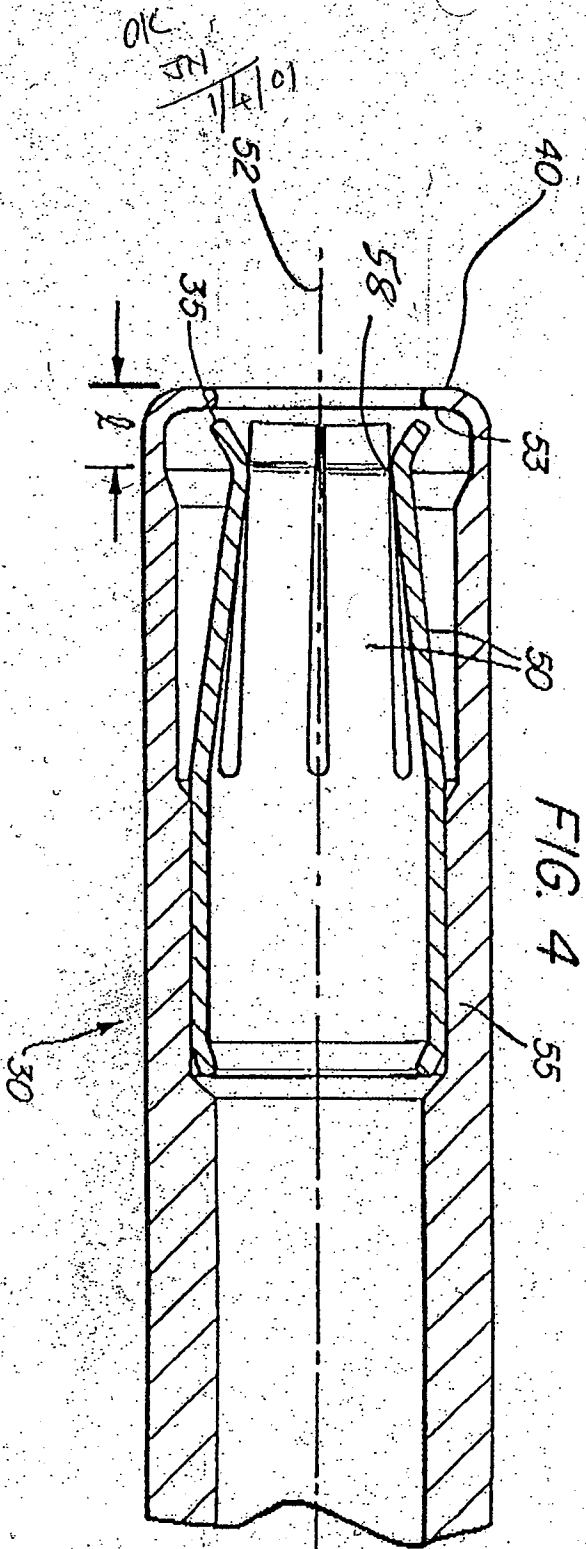
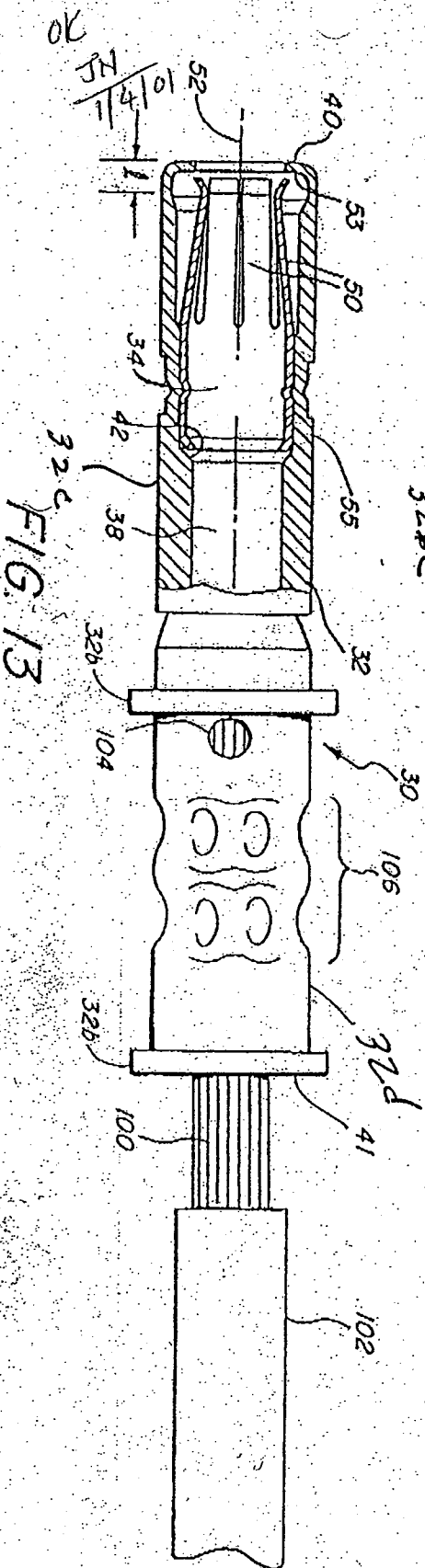
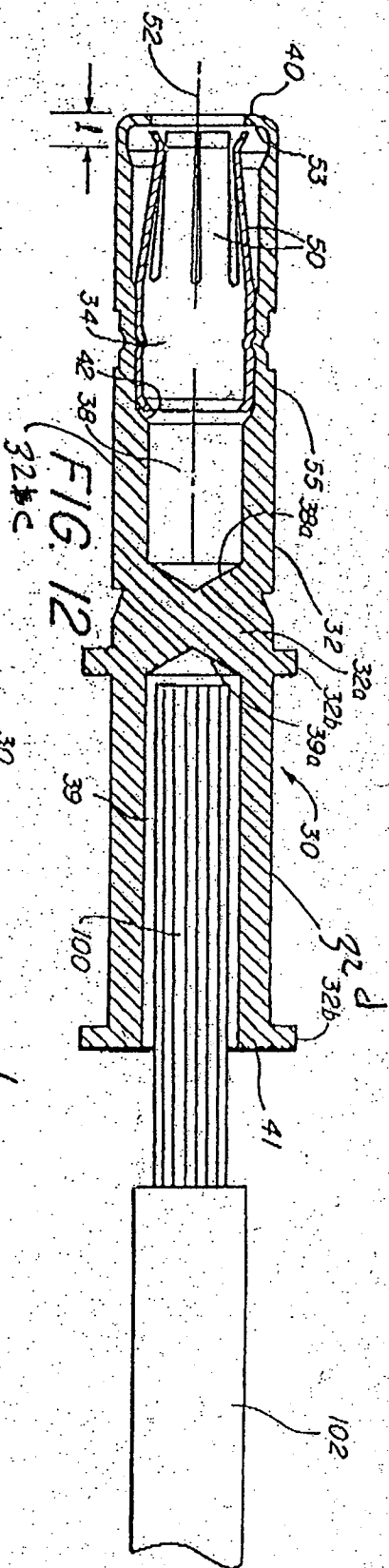
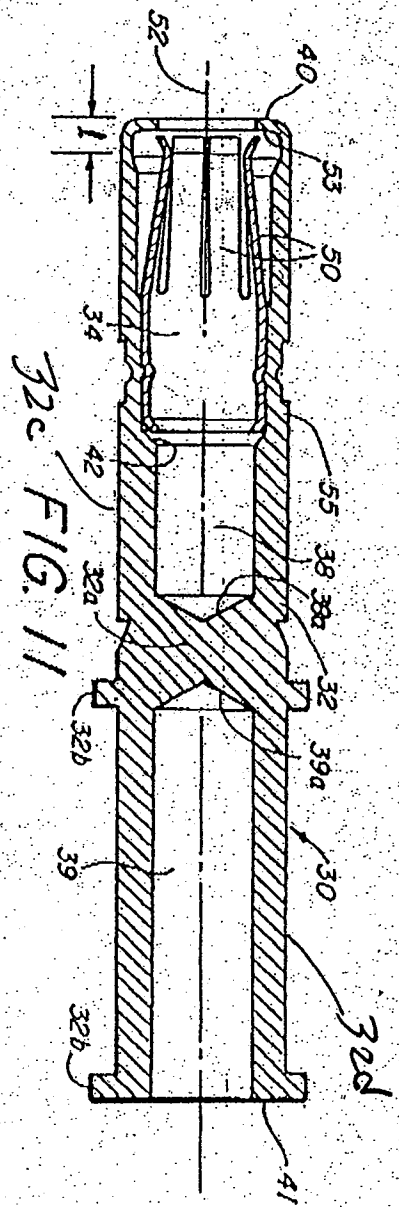


FIG. 4



# EXHIBIT 8

<b>Notice of Allowability</b>	Application No.	Applicant(s)	
	09/395,515	KEREK, LESLIE LASZLO	
	Examiner	Art Unit	
	Javaid Nasri	2839	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance and Issue Fee Due or other appropriate communication will be mailed in due course. THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS. This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment received on 11/20/2000 & 1/4/2001.
2. ☒ The allowed claim(s) is/are 1-5 and 7-21.
3. ☐ The drawings filed on \_\_\_\_\_ are acceptable as formal drawings.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.
5. ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. THIS THREE-MONTH PERIOD IS NOT EXTENDABLE FOR SUBMITTING NEW FORMAL DRAWINGS, OR A SUBSTITUTE OATH OR DECLARATION. This three-month period for complying with the REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL is extendable under 37 CFR 1.136(a).

6. ☐ Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient. A SUBSTITUTE OATH OR DECLARATION IS REQUIRED.
7. ☒ Applicant MUST submit NEW FORMAL DRAWINGS
  - (a) ☒ including changes required by the Notice of Draftsperson's Patent Drawing Review( PTO-948) attached
    - 1) ☐ hereto or 2) ☒ to Paper No. 2.
  - (b) ☒ including changes required by the proposed drawing correction filed 20 November 2000, which has been approved by the examiner.
  - (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

8. ☐ Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Any reply to this letter should include, in the upper right hand corner, the APPLICATION NUMBER (SERIES CODE / SERIAL NUMBER). If applicant has received a Notice of Allowance and Issue Fee Due, the ISSUE BATCH NUMBER and DATE of the NOTICE OF ALLOWANCE should also be included.

#### Attachment(s)

- |  |   |
|--|---|
| <input type="checkbox"/> Notice of References Cited (PTO-892)  | <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)          |
| <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                    | <input type="checkbox"/> Interview Summary (PTO-413), Paper No. _____             |
| <input type="checkbox"/> Information Disclosure Statements (PTO-1449), Paper No. _____               | <input checked="" type="checkbox"/> Examiner's Amendment/Comment                  |
| <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
|  | <input type="checkbox"/> Other  |

Application/Control Number: 09/395,515

Page 2

Art Unit: 2839

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with attorney Harold L. Jackson on 1/4/2001.

The application has been amended as follows:

In claim 18, line 32, "]" has been deleted.

### REASONS FOR ALLOWANCE

2. The following is an examiner's statement of reasons for allowance:

The primary reason for allowance of the claims is the inclusion of the limitation, the hoodless socket contact is a two - piece contact body having socket body with a forward tubular portion, a rearward tubular portion, the second piece of the contact is a separate sleeve spring member positioned in the forward tubular portion of the socket body having a forward portion and a rear portion, the forward portion having a plurality of forwardly and inwardly extending fingers which terminates near the free male contact receiving end of the first tubular portion, in combination with other limitations in the claim which is not found in the prior art reference of record.

Application/Control Number: 09/395,515

Page 3

Art Unit: 2839

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

#### Contact

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Javaid Nasri whose telephone number is 703 308 5876. The examiner can normally be reached on Monday to Friday.

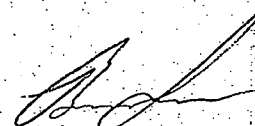
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 703 308 3119. The fax phone numbers for the organization where this application or proceeding is assigned are 703 308 7722 for regular communications and 703 308 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

JN

jhn

January 17, 2001



Brian Sircus  
Primary Examiner

# EXHIBIT 9





PRECIDIP DURTAL SA  
Rue St Maurice 34, PO box 341  
CH-2800 Delémont, Switzerland  
Phone: +41 (0)32 421 04 00  
Fax: +41 (0)32 421 04 01

Tri-Star Electronics Int'l, Inc.  
Mr. Felix Acosta  
Director of Engineering  
2201 Rosecrans Avenue

El Segundo, CA 90245 U.S.A.

Delémont, le 26 avril 2006

**CONFIDENTIAL - FOR SETTLEMENT PURPOSES ONLY**

Subject: Tri-Star's Patent Infringement Allegations

Dear Mr. Acosta,

Thank you for your April 12 letter.

We have now had an opportunity to investigate, with assistance of patent counsel, and to consider Tri-Star's patent infringement allegations. In particular, we have carefully reviewed the U.S. and Australian patents and their files and the European patent application identified in your February 16 letter, in view of Preci-Dip's products. We have concluded that Preci-Dip's products do not infringe any valid, enforceable claim of Tri-Star's patents and application for a "Hoodless Electrical Socket Contact" because among other reasons, our product has three pieces, including a stainless steel hood.

We trust that our comments conclude this matter, and we thank you for your amicable presentation of your concerns.

Best regards.

Very truly yours,

PRECIDIP DURTAL SA  
Pierre Lehmann, CEO

Cc: James A. Oliff, Patent Attorney



# EXHIBIT 10



**TRI-STAR**  
Electronics International, Inc.

2201 Rosecrans Avenue  
El Segundo, CA 90245 U.S.A.  
Tel: 310.536.0444  
Fax: 310.536.9322  
www.tri-starelectronics.com

November 14, 2007

Mr. Pierre Lehmann, CEO  
Preci-Dip Durtal SA  
Rue St-Maurice 34, PO Box 341  
CH-2800 Delemont, Switzerland

Ref: Preci-Dip Durtal letter regarding Patent Issues

Dear Pierre Lehmann,

Felix Acosta and you have corresponded on our concerns regarding our patent on Mil-C-39029 socket contacts and product being sold by Preci-Dip. In your last letter you noted the title of our patent "Hoodless Electrical Socket Contact" and pointed out that your product has three piece construction.

The key and significant characteristics of our patent are of course located in the body of our patent filing and not in the patent title. We have carefully reviewed your actual product as well as your patent filing and the internal design elements definitely and unquestionably conflicts with our patent. For instance, your product having a hood or sleeve does not cancel out our patent on the outward facing internal clip. There is also no question that our patent was indeed filed before your patent filing.

Tri-Star has invested a great deal of time and effort into the development and implementation of this unique contact design. I am sure you can understand our intent to protect our investment and patent to the fullest extent allowed by U.S. and international patent laws.

The primary purpose of this letter is twofold. First, I want to advise you that your product most definitely violates our patent filings. Secondly, I also wanted to open a dialogue with Preci-Dip so that we could attempt to resolve this issue between our two companies without a lengthy conflict. I would be willing to open a discussion regarding licensing or royalty arrangements prior to other courses of actions. I visit Europe on a regular basis and would be happy to arrange a meeting with you to discuss potential resolutions.

We would like to hear back from Preci-Dip whether you plan to explore these arrangements with Tri-Star or not. My hope is for the two of us to reach a business resolution and move forward.

I will look forward to your response.

Best regards,

David J. Bouzek  
VP & Business Unit Manager, Contacts

cc: John Carson, Fulbright & Jaworski, Intellectual Property Attorneys at Law



# EXHIBIT 11

(AJWx), AO120, DISCOVERY

**UNITED STATES DISTRICT COURT, CENTRAL DISTRICT OF CALIFORNIA  
(Western Division - Los Angeles)  
CIVIL DOCKET FOR CASE #: 2:08-cv-04226-GAF-AJW**

Tri-Star Electronics International, Inc. v. Preci-Dip Durtal  
SA  
Assigned to: Judge Gary A. Feess  
Referred to: Magistrate Judge Andrew J. Wistrich  
Cause: 35:271 Patent Infringement

Date Filed: 06/26/2008  
Jury Demand: Plaintiff  
Nature of Suit: 830 Patent  
Jurisdiction: Federal Question

**Plaintiff**

**Tri-Star Electronics International,  
Inc.**  
*a Delaware corporation*

represented by **Gregory B Wood**  
Fulbright and Jaworski  
555 South Flower Street  
41st Floor  
Los Angeles, CA 90071  
213-892-9200  
Fax: 213-892-9494  
Email: gwood@fulbright.com  
**LEAD ATTORNEY**  
**ATTORNEY TO BE NOTICED**

**Spencer Persson**  
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555 South Flower Street  
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213-892-9200  
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**LEAD ATTORNEY**  
**ATTORNEY TO BE NOTICED**

**Todd M Sorrell**  
Fulbright and Jaworski  
555 South Flower Street  
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Los Angeles, CA 90071  
213-892-9200  
Fax: 213-892-9494  
Email: tsorrell@fulbright.com  
**LEAD ATTORNEY**  
**ATTORNEY TO BE NOTICED**

V.

**Defendant**

**Preci-Dip Durtal SA**

*a Swiss corporation*

Date Filed	#	Docket Text
06/26/2008	<u>1</u>	COMPLAINT against Defendant Preci-Dip Durtal SA. (Filing fee \$ 350 PAID.) Jury Demanded., filed by Plaintiff Tri-Star Electronics International, Inc. (et) (ds). (Entered: 06/30/2008)
06/26/2008		20 DAY Summons Issued re Complaint - (Discovery) <u>1</u> as to Defendant Preci-Dip Durtal SA. (et) (Entered: 06/30/2008)
06/26/2008	<u>2</u>	CERTIFICATION AND NOTICE of Interested Parties filed by Plaintiff Tri-Star Electronics International, Inc., identifying Corporate Parent TSEI Holding, Inc. (formerly BMP/TSEI Holdings, Inc.) for Tri-Star Electronics International, Inc. (et) (ds). (Entered: 06/30/2008)
06/26/2008	<u>3</u>	REPORT ON THE FILING OF AN ACTION Regarding a Patent (Initial Notification) filed by Tri-Star Electronics International, Inc. (et) (Entered: 06/30/2008)

PACER Service Center			
Transaction Receipt			
08/15/2008 08:14:28			
PACER Login:	ng0010	Client Code:	018080.0601mef
Description:	Docket Report	Search Criteria:	2:08-cv-04226-GAF-AJW End date: 8/15/2008
Billable Pages:	2	Cost:	0.16

# EXHIBIT 10



**TRI-STAR**  
Electronics International, Inc.

2201 Rosecrans Avenue  
El Segundo, CA 90245 U.S.A.  
Tel: 310.536.0444  
Fax: 310.536.9322  
www.tri-starelectronics.com

November 14, 2007

Mr. Pierre Lehmann, CEO  
Preci-Dip Durtal SA  
Rue St-Maurice 34, PO Box 341  
CH-2800 Delemont, Switzerland

Ref: Preci-Dip Durtal letter regarding Patent Issues

Dear Pierre Lehmann,

Felix Acosta and you have corresponded on our concerns regarding our patent on Mil-C-39029 socket contacts and product being sold by Preci-Dip. In your last letter you noted the title of our patent "Hoodless Electrical Socket Contact" and pointed out that your product has three piece construction.

The key and significant characteristics of our patent are of course located in the body of our patent filing and not in the patent title. We have carefully reviewed your actual product as well as your patent filing and the internal design elements definitely and unquestionably conflicts with our patent. For instance, your product having a hood or sleeve does not cancel out our patent on the outward facing internal clip. There is also no question that our patent was indeed filed before your patent filing.

Tri-Star has invested a great deal of time and effort into the development and implementation of this unique contact design. I am sure you can understand our intent to protect our investment and patent to the fullest extent allowed by U.S. and international patent laws.

The primary purpose of this letter is twofold. First, I want to advise you that your product most definitely violates our patent filings. Secondly, I also wanted to open a dialogue with Preci-Dip so that we could attempt to resolve this issue between our two companies without a lengthy conflict. I would be willing to open a discussion regarding licensing or royalty arrangements prior to other courses of actions. I visit Europe on a regular basis and would be happy to arrange a meeting with you to discuss potential resolutions.

We would like to hear back from Preci-Dip whether you plan to explore these arrangements with Tri-Star or not. My hope is for the two of us to reach a business resolution and move forward.

I will look forward to your response.

Best regards,

David J. Bouzek  
VP & Business Unit Manager, Contacts

cc: John Carson, Fulbright & Jaworski, Intellectual Property Attorneys at Law



# EXHIBIT 11



(AJWx), AO120, DISCOVERY

**UNITED STATES DISTRICT COURT, CENTRAL DISTRICT OF CALIFORNIA  
(Western Division - Los Angeles)  
CIVIL DOCKET FOR CASE #: 2:08-cv-04226-GAF-AJW**

Tri-Star Electronics International, Inc. v. Preci-Dip Durtal  
SA  
Assigned to: Judge Gary A. Feess  
Referred to: Magistrate Judge Andrew J. Wistrich  
Cause: 35:271 Patent Infringement

Date Filed: 06/26/2008  
Jury Demand: Plaintiff  
Nature of Suit: 830 Patent  
Jurisdiction: Federal Question

**Plaintiff**

**Tri-Star Electronics International,  
Inc.**  
*a Delaware corporation*

represented by **Gregory B Wood**  
Fulbright and Jaworski  
555 South Flower Street  
41st Floor  
Los Angeles, CA 90071  
213-892-9200  
Fax: 213-892-9494  
Email: gwood@fulbright.com  
*LEAD ATTORNEY*  
*ATTORNEY TO BE NOTICED*

**Spencer Persson**  
Fulbright and Jaworski  
555 South Flower Street  
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Email: spersson@fulbright.com  
*LEAD ATTORNEY*  
*ATTORNEY TO BE NOTICED*

**Todd M Sorrell**  
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*LEAD ATTORNEY*  
*ATTORNEY TO BE NOTICED*

V.

**Defendant**

**Preci-Dip Durtal SA**

*a Swiss corporation*

Date Filed	#	Docket Text
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06/26/2008		20 DAY Summons Issued re Complaint - (Discovery) <u>1</u> as to Defendant Preci-Dip Durtal SA. (et) (Entered: 06/30/2008)
06/26/2008	<u>2</u>	CERTIFICATION AND NOTICE of Interested Parties filed by Plaintiff Tri-Star Electronics International, Inc., identifying Corporate Parent TSEI Holding, Inc. (formerly BMP/TSEI Holdings, Inc.) for Tri-Star Electronics International, Inc. (et) (ds). (Entered: 06/30/2008)
06/26/2008	<u>3</u>	REPORT ON THE FILING OF AN ACTION Regarding a Patent (Initial Notification) filed by Tri-Star Electronics International, Inc. (et) (Entered: 06/30/2008)

PACER Service Center			
Transaction Receipt			
08/15/2008 08:14:28			
PACER Login:	ng0010	Client Code:	018080.0601mef
Description:	Docket Report	Search Criteria:	2:08-cv-04226-GAF-AJW End date: 8/15/2008
Billable Pages:	2	Cost:	0.16

# EXHIBIT 12



**TRI-STAR**  
Electronics International, Inc.

2201 Rosecrans Avenue  
El Segundo, CA 90245 U.S.A.  
Tel: 310.536.0444  
Fax: 310.536.9322  
www.tri-starelectronics.com

June 27, 2008

DB → GM-PL  
Page 1/15

Chon Bui  
Aero Electric Connector  
548 Arnapola Avenue  
Torrance, CA 90501

Re: Tri-Star Patent Infringement Suit Regarding  
Preci-Dip Socket Contacts (MIL C-39029)

Dear Chon,

Tri-Star has invested considerable time and effort in developing and patenting its contact technology. It has come to the attention of Tri-Star that Preci-Dip Dural SA is manufacturing, importing and distributing a line of electrical socket contacts called Preci-Dip Socket Contacts (MIL C-39029) that Tri-Star believes infringe Tri-Star's U.S. Patent No. 6,250,974. Under U.S. patent laws, anyone who makes, uses, imports, sells, distributes or offers for sale a product covered by a U.S. Patent, without authorization of the patent owner, infringes that patent.

Accordingly, and in order to protect its valuable intellectual property rights, Tri-Star, on June 26, 2008, filed a suit in United States District Court for the Central District of California against Preci-Dip for infringement of Tri-Star's U.S. Patent No. 6,250,974.

Enclosed is a copy of the U.S. District Court Complaint and the attached Tri-Star Contact patent for your review and evaluation in connection with your sale of products manufactured by Preci-Dip.

Please direct any questions you might have to David Bouzek, Tri-Star V.P. & Business Unit Manager, by telephone at 310-536-1313 or by email at david.bouzek@tri-starelectronics.com.

Enclosure: U.S. District Court Complaint  
Tri-Star Contact Patent

Best regards,

*David J. Bouzek*  
David J. Bouzek





FILED

2008 JUN 26 AM 10:59  
CLERK OF DISTRICT COURT  
CENTRAL DISTRICT OF CALIF.  
LOS ANGELES

GREGORY B. WOOD (BAR NO. 068064)  
TODD M. SORRELL (BAR NO. 175143)  
SPENCER PERSSON (BAR NO. 235054)  
FULBRIGHT & JAWORSKI L.L.P.  
555 South Flower Street  
Forty-First Floor  
Los Angeles, CA 90071  
Telephone: (213) 892-9200  
Facsimile: (213) 892-9494  
Email: gwood@fulbright.com  
tsorrell@fulbright.com  
spersson@fulbright.com

Attorneys for Plaintiff  
TRI-STAR ELECTRONICS  
INTERNATIONAL, INC.

IN THE UNITED STATES DISTRICT COURT  
FOR THE CENTRAL DISTRICT OF CALIFORNIA

TRI-STAR ELECTRONICS  
INTERNATIONAL, INC., a Delaware  
corporation,

Plaintiff,

v.

PRECI-DIP DURTAL SA, a Swiss  
corporation,

Defendant.

CV08-04226

GAF AJW

Civil Action No.

COMPLAINT FOR PATENT  
INFRINGEMENT

DEMAND FOR JURY TRIAL

INVENT PREPARED  
RECYCLED PAPER

701244843

P.3  
P.003

Date/h receipt 30-JUN-2008 (LUN) 23:08  
3103575593  
3103575593 HERO ELECTRIC PURCHASING 3103575593  
JUL 01 2008 2:42PM



1 Plaintiff Tri-Star Electronics International, Inc., formerly known as TSEI  
2 Delaware Two, Inc. ("Tri-Star"), by its attorneys and for its complaint against  
3 Defendant Preci-Dip Durtal SA ("Preci-Dip"), alleges as follows:

4 NATURE OF THE ACTION

5 1. This is a patent infringement action to stop Preci-Dip from  
6 infringement of United States Patent No. 6,250,974 (the "'974 Patent"), entitled  
7 HOODLESS ELECTRICAL SOCKET CONTACT, by inter alia, making, using,  
8 selling, importing, and/or offering for sale including but not limited to electrical  
9 socket contacts, which includes but is not limited to the product designated as MIL-  
10 C-39029 ("Preci-Dip Socket Contact Products"). The '974 patent was duly and  
11 legally issued on June 26, 2001, after full and fair examination by the United States  
12 Patent and Trademark Office. A true and correct copy of the '974 Patent is  
13 attached hereto as Exhibit A. The '974 Patent has been duly and legally assigned to  
14 Tri-Star, which is now (and at all relevant times has been) the owner and possessor  
15 of all rights pertaining to the '974 Patent.

16 PARTIES

17 2. Plaintiff Tri-Star is a corporation duly organized and existing under the  
18 laws of the State of Delaware and is the successor by merger to Tri-Star Electronics  
19 International, Inc., a California corporation.

20 3. Upon information and belief, Defendant Preci-Dip is a Swiss  
21 corporation having its headquarters and principal place of business at Rue Saint-  
22 Maurice 34, P.O. Box 834, CH-2800 Delémont, Switzerland. Preci-Dip conducts  
23 business on a regular basis in the State of California.

24 JURISDICTION AND VENUE

25 4. This Court has subject matter jurisdiction over this action pursuant to  
26 28 U.S.C. §§ 1331 and 1338(a) because it arises under the patent laws of the United  
27 States, including 35 U.S.C. §§ 271 et seq.

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5. This Court has personal jurisdiction over Preci-Dip because Tri-Star is informed and believes that Preci-Dip has established minimum contacts with the forum such that the exercise of jurisdiction over Preci-Dip would not offend traditional notions of fair play and substantial justice. Preci-Dip has established these minimum contacts by conducting business on a regular basis within the State of California and this district, and purposely placing infringing products into the stream of commerce with the expectation they will be purchased and used by consumers in California, including this district.

6. Venue is proper in this Court pursuant to 28 U.S.C. §§ 1391(b), 1391(c) and 1400(b) because Preci-Dip has committed acts of infringement in this district and division and has sold the infringing products in this district and division.

# COUNT 1

## INFRINGEMENT OF U.S. PATENT NO. 6,250,974

7. Plaintiff incorporates by reference paragraphs 1 through 6, the same as if set forth at length.

8. Upon information and belief, Preci-Dip has directly infringed and continues to infringe directly or under the doctrine of equivalents, by making, using, selling, providing, importing and offering to sell (directly or through intermediaries) Preci-Dip Socket Contact Products in this district and throughout the United States.

9. Upon information and belief, Preci-Dip has contributed to the infringement of the '974 patent, and/or actively induced others to infringe (directly or under the doctrine of equivalents) the '974 patent in this District and elsewhere in the United States and its territories.

10. Preci-Dip's acts of infringement have caused damage to Tri-Star, and Tri-Star is entitled to recover from Preci-Dip the damages sustained by Tri-Star as a result of Preci-Dip's individual wrongful acts in an amount subject to proof at trial.



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**DEMAND FOR JURY TRIAL**

Pursuant to Federal Rule of Civil Procedure, Rule 38, Tri-Star demands a trial by jury.

Dated: June 26, 2008

GREGORY B. WOOD  
TODD M. SORRELL  
SPENCER PERSSON  
FULBRIGHT & JAWORSKI L.P.

By

  
GREGORY B. WOOD  
Attorneys for Plaintiff  
TRI-STAR ELECTRONICS  
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(12) **United States Patent**  
Kerek

(10) Patent No.: **US 6,250,974 B1**  
(45) Date of Patent: **Jun. 26, 2001**

(54) **HOODLESS ELECTRICAL SOCKET CONTACT**

(75) Inventor: **Leslie Lazlo Kerek, Los Angeles, CA (US)**

(73) Assignee: **Tri-Star Electronics International, Inc., El Segundo, CA (US)**

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 354(b) by 0 days.

(21) Appl. No.: **09/395,515**

(22) Filed: **Sep. 14, 1999**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 09/104,733, filed on Jan. 25, 1998, now abandoned.

(51) Int. Cl. **H01R 13/187**

(52) U.S. Cl. **439/843**

(56) Field of Search **439/843, 851, 439/856, 845**

(56) **References Cited**

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4,920,117 \* 1/1996 Nestor et al. 439/851  
5,108,318 \* 4/1992 Sakurai et al. 439/843  
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\* cited by examiner

Primary Examiner—Eric S. Struss

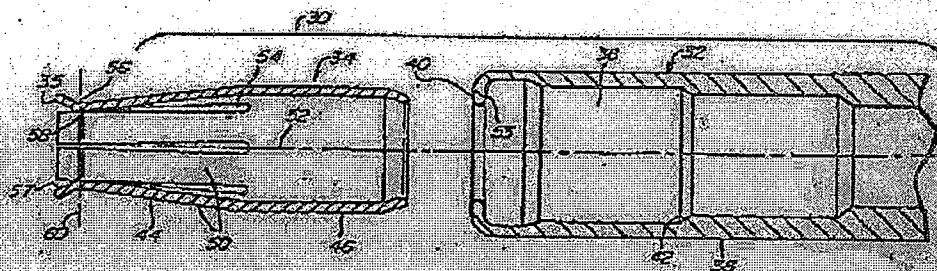
Assistant Examiner—Javah Naseri

(74) Attorney, Agent, or Firm—Harold L. Jackson

(57) **ABSTRACT**

A connector terminal is disclosed including a cylindrical socket body with a spring contact inserted therein. The spring contact has a distal portion that extends a press fit with the socket body. The socket body may be crimped over the distal portion to more securely hold the spring contact in the socket body. The spring contact further has a plurality of fingers which taper forwardly and laterally to resiliently grab a male pin as it enters the socket.

20 Claims, 5 Drawing Sheets



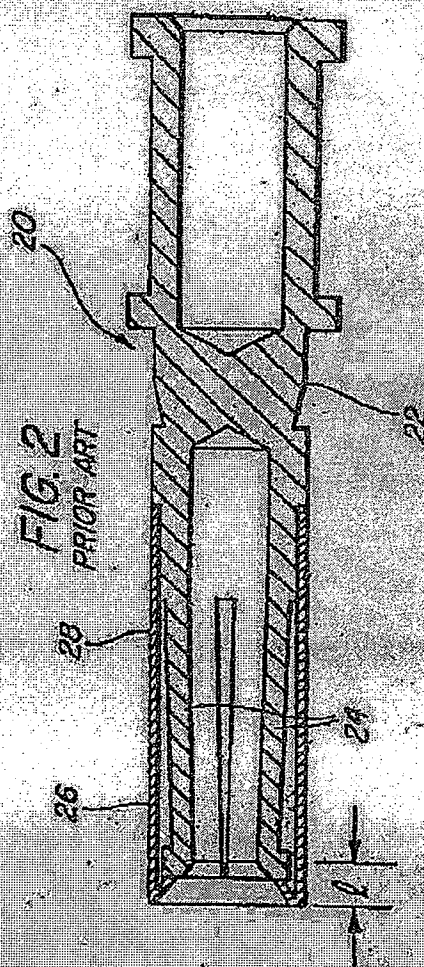
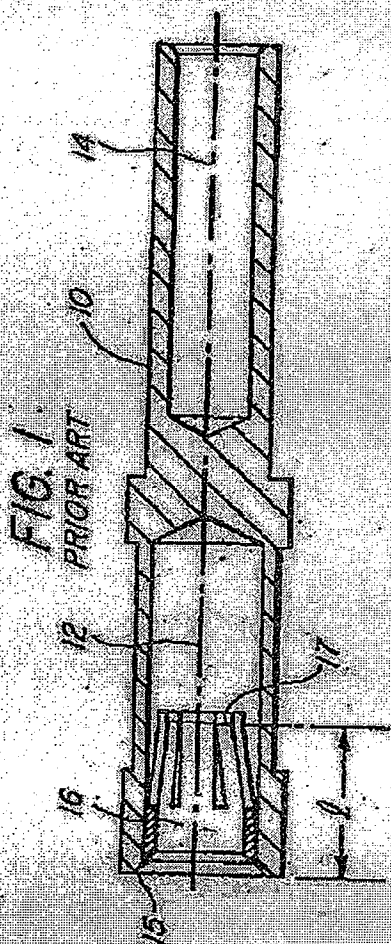


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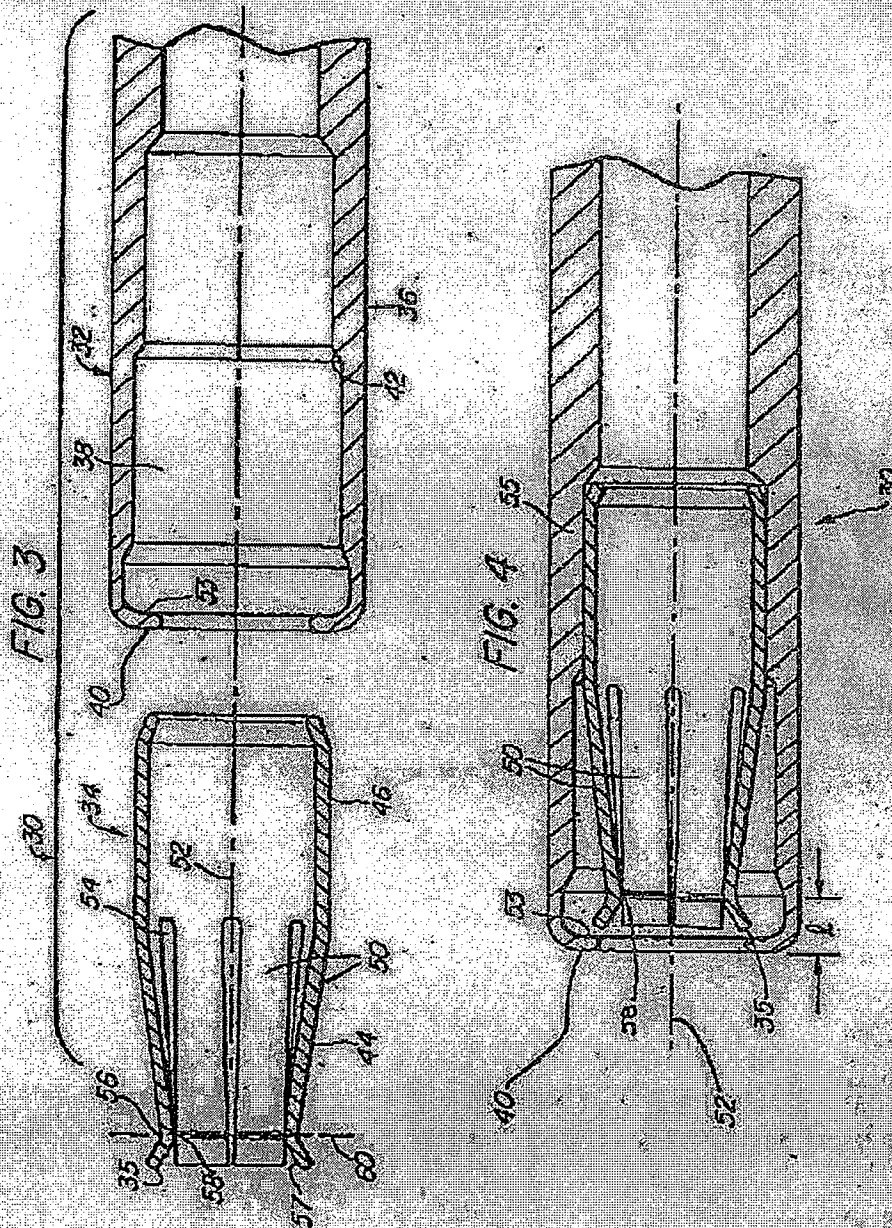


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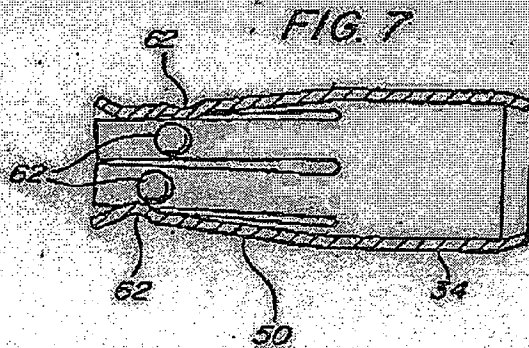
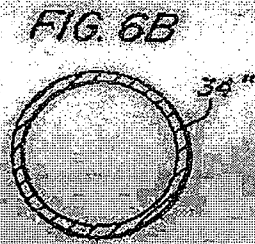
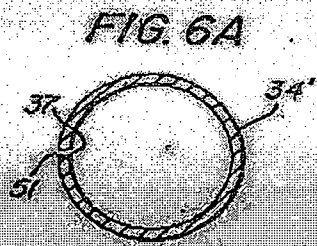
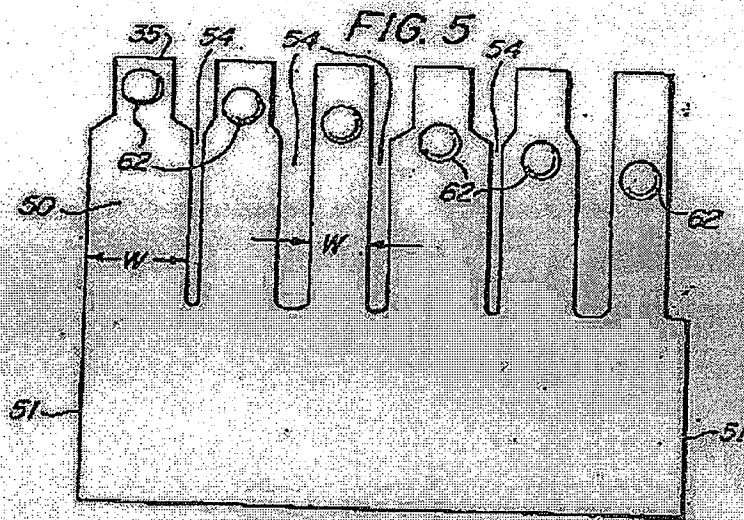


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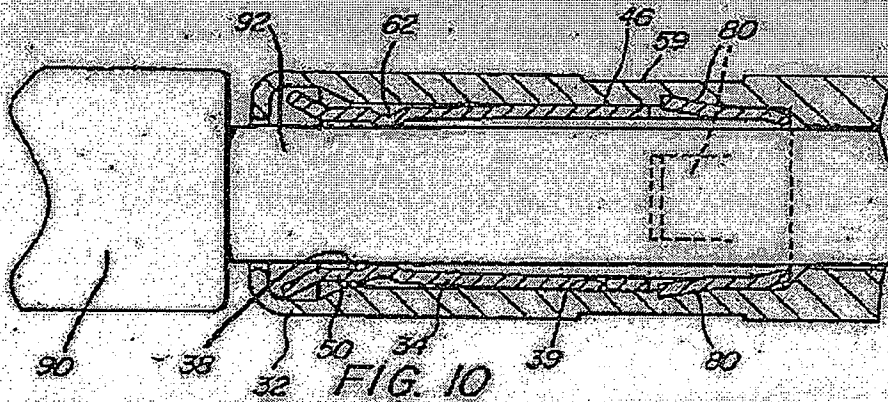
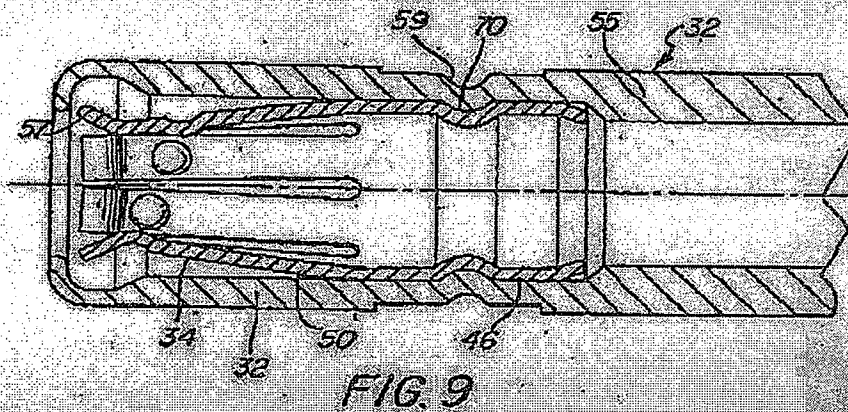
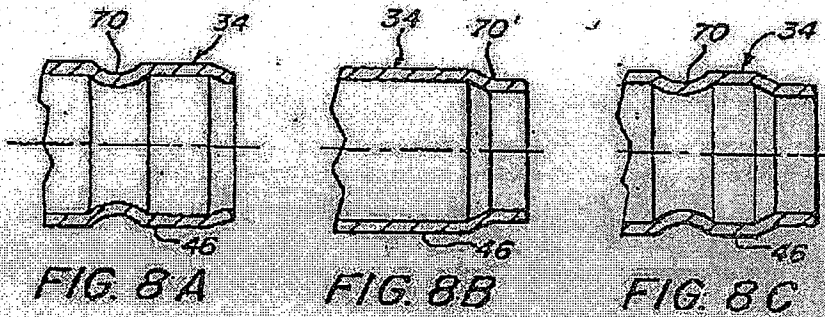


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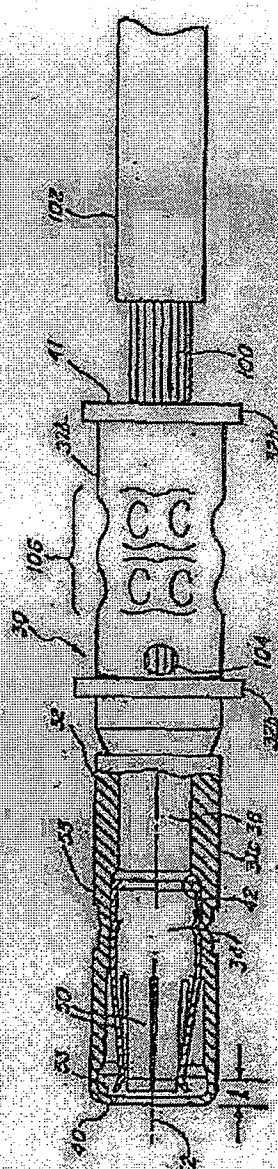
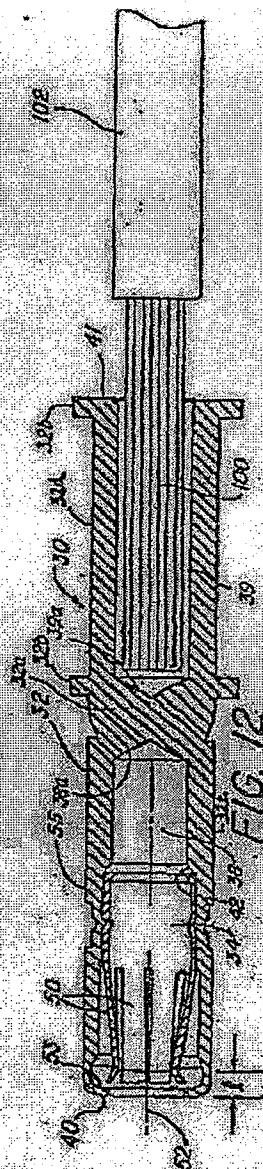
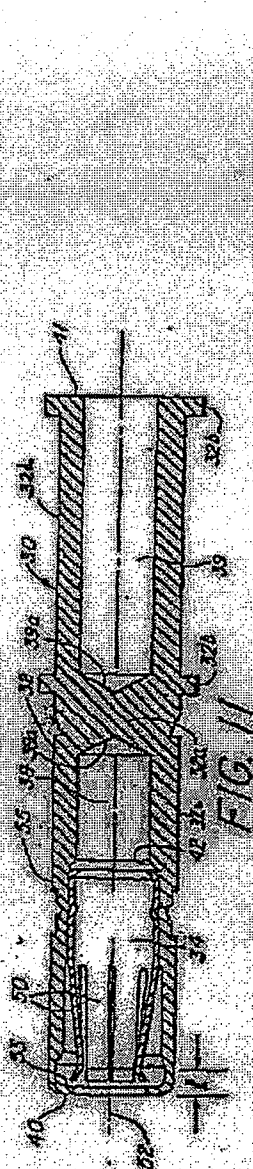


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# HOODLESS ELECTRICAL SOCKET CONTACT

## RELATED APPLICATION

This application is a continuation-in-part of my application Ser. No. 09/104,733 filed Jun. 25, 1998 entitled Hoodless Electrical Socket Connector which was abandoned on Feb. 4, 2000.

## FIELD OF THE INVENTION

This invention relates generally to electrical contacts and more particularly, it is directed to a hoodless socket contact and method for making the same.

## BACKGROUND OF THE INVENTION

Electrical contacts are present in all aviation, military and aerospace equipment environments such as in helicopters, missiles and planes. Such equipment may have dozens or even hundreds or even thousands of electrical connections that must be made between electronic power supplies, sensors, actuators, circuit boards, bus wiring, wiring harnesses, to provide the electrical pathways or highways needed to transport electricity in the form of control signals and power. The hardware reliability requirements for operating in an aviation environment are stringent as a failure can have catastrophic consequences. As such, the electrical components and circuitry, as well as the connectors and contact therein employed to electrically connect these items, must work in a wide range and wide variety of environmental conditions such as mechanical vibration, wide temperature ranges, humidity and corrosive elements, etc. For example, military standards (also known in the industry as mil-specs) for aircraft avionics equipment require that contacts be able to make and unmake a minimum of five hundred times without a failure during all anticipated environmental and mechanical conditions. In addition, the contact assemblies must be protected to withstand repeated handling, without significant distortion or damage to the interconnecting parts which could lead to a lack of electrical continuity.

One example of a high-temperature power socket contact or terminal is illustrated in U.S. Pat. No. 5,375,012 "Power Pin Terminal" to Clark which includes a contact socket receiving portion and an integral mounting portion. The socket includes a web with a plurality of beams thereon. Each of the beams has a curved surface with a bead, which beams cooperate to form an axially extending tubular socket region which accepts a pin terminal of any desired length. Disadvantageously, the beams are exposed and therefore subject to damage. Additionally, the beams of the socket contact are not protected from entry of an oversized male contact which may bend the beams beyond their elastic limit thereby damage the connector so that it will not perform electrically.

Another example of a socket contact is illustrated in U.S. Pat. No. 4,906,212 entitled "Electrical Pin and Socket Connector" to Nixon, Jr. which includes a socket having a cylindrical mating portion defined by cantilever beams having one or more blades wherein one or more of the blades include a rearwardly extending free end. The pin includes a mating portion having a bullet nose at one end and a conical bullet at another end. This connector suffers from the same limitations as the Clark connector and therefore is an undesirable alternative in environments where high reliability is critical.

A prior art female contact which is used in non-critical and in non-aerospace applications is shown in FIG. 1 which contact includes a cylindrical member 10 having holes 12 and 14 in the ends thereof. A spring member 16 is inserted in one of the ends of the spring member tapering rearwardly into the hole 12. Accordingly, a male pin contact inserted into the cylindrical member 10 would be grasped by the spring member 16 relatively deeply within the hole 12 which is disadvantageous. The distance from the free end 14 of the socket to the point of engagement 17 with a male contact or pin is designated by the letter "L" in FIG. 1 (and in FIG. 2). The particular connector halves in which the male and female contacts are used (and the positioning of the connector halves on the equipment, e.g., trays and back boxes) may result in a lesser or greater penetration of the male pin into the socket body. Furthermore, there is no mechanical structure to ensure that the spring member 16 will remain in place and as such the spring may "walk out" of the hole during vibration or during mating and unmating cycles. Mill specs require that a spring member which provides the electrical conductivity must be able to withstand the separation force during the re-mating cycle (i.e., 500) without being dislodged under all anticipated environmental conditions including vibration. The arrangement of the spring 16 socket member 10 could be potentially hazardous if used in aviation environments where high reliability is a must for human safety.

Another example of a socket contact that is successfully manufactured and sold by the assignee of the present invention is shown in FIG. 2. This contact 20, sometimes referred to as a hooded socket contact, includes a tubular socket body 22 having a plurality of fins 24 for receiving a male contact or pin. A hood 26 is inserted over the fins 24 and rear portion of a contact to protect the fins from damage. The hood is generally made of stainless steel with a wall thickness of only 0.004 to 0.010" for economic and reliability reasons. The hood is press fit over the cylindrical shoulder portion 28 at the rear of the contact. This press fit arrangement, due to the hood's wall thickness, requires precision manufacturing. Improper sizing of the socket body shoulder may result in damage to the hood during the press fit operation or the hood may come loose during use. Flaring of the contact may exacerbate the press fit step during manufacturing. Furthermore, a stainless steel hood may not be tolerated in certain applications where interference with magnetic fields is a problem. In summary, the manufacturing steps necessary to insure reliable performance of the hooded type contact shown in FIG. 2 may result in a fairly expensive contact when mass produced.

Accordingly, there is a need for an improved socket contact that is simple to manufacture yet reliable in performance and that can be made in mass quantities at relatively low cost.

## SUMMARY OF THE INVENTION

The foregoing mentioned disadvantages are avoided by providing a hoodless socket or female contact for engaging a male pin contact. The female contact includes a socket body with two ends, each end having an axially oriented bore or hole. A spring for making an electrical connection with a male contact or pin is located in one of the holes. The spring is arranged for resiliently engaging the male pin contact in close proximity to the bore entry point or free end of the socket body. Means are provided for securely holding the spring in the bore, which may be established by a press fit of the spring within the hole coupled with an extension of the socket body overlaying a portion of the spring thereby preventing the spring from exiting from the socket body.

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Alternatively, the spring may be securely coupled in the socket body by crimping the socket body onto the spring. Preferably, this is achieved by crimping a portion of the socket body into a peripheral annular groove in the spring. Ribs on the spring, which engage the inner wall of the hole of the socket body, may also be employed, with or without crimping, to provide additional security.

The hole at the other end of the socket body is sized and shaped to receive a conductor such as a insulated copper wire. The conductor may be electrically and mechanically secured together with the socket body by crimping the socket body onto the conductor.

The construction and operation of preferred embodiments of the contact of the present invention may best be understood by reference to the following description taken in conjunction with the accompanying drawings to which like components or features are designated by the same or printed reference numerals.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side cross-sectional view of a prior art contact.

FIG. 2 is a side cross-sectional view of another prior art contact.

FIG. 3 is a side cross-sectional, partially broken away side view of a socket contact in accordance with the principles of the invention illustrating the two parts of the socket contact prior to assembly.

FIG. 4 is a side cross-sectional, partially broken away side view of the contact parts of FIG. 3 assembled together.

FIG. 5 is a side view of a stamped out spring prior to roll forming.

FIGS. 6A and B are cross-sectional views illustrating a spring made from roll forming ("seam type") or deep drawn ("drawn type") processes, respectively.

FIG. 7 is a side cross-sectional view of the spring with dimples.

FIGS. 8A-C are partial side cross-sectional views of the back end of the spring with optional groove configurations therein.

FIG. 9 is a cross-sectional side view of an assembled socket contact that has been crimped.

FIG. 10 is a cross-sectional view of another assembled socket contact wherein the two parts are assembled together and in addition are also retained by bars and a pin terminal is inserted into the socket contact.

FIG. 11 is a cross-sectional side view illustrating the two parts of the socket contact prior to assembly with an electrical conductor.

FIG. 12 is a cross-sectional side view of the socket contact with metal strands of an insulated conductor wire inserted into the rear portion of the socket body prior to crimping, and

FIG. 13 is a partially broken away side view of the socket contact with the rear portion of the socket body crimped onto the wire strands.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings and more particularly to FIGS. 3 and 4, there is shown a socket contact generally indicated by reference number 30. The socket contact, sometimes hereinafter referred to as a hoodless socket, is made from two parts including a socket body 32 and a spring 34. The socket body 32 consists of a cylindrically or

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irregularly shaped member 36 having two ends, with an axially disposed male-contact-receiving hole or bore 38 extending from one of the ends 40 (i.e., free end) into the socket body a preselected distance and a conductor or wire receiving hole of bore 39 at the other end 41 thereof. See FIG. 11. The socket body 32 may be made of an electrically conductive material such as a brass/copper alloy. The male-contact-receiving hole 38 may have an inwardly projecting shoulder 42 that provides a back stop for the seating of the spring 34.

The spring 34 contains a forward male contact receiving portion 44 and a rear mounting portion 46. The contact receiving portion 44 includes a plurality of fingers or ribs 50. The fingers are arranged around the longitudinal axis 52 of the spring 34 and are separated by gaps or slots 54 between adjacent fingers. Each of the forwardly extending fingers tapers inwardly to define together a tubularly shaped contact region 56 and 58 which engages a male pin inserted therebetween and to provide a reliable electrical connection therebetween under anticipated adverse conditions. The portion of the fingers forward of the contact region 56 bend outwardly to form a flared region 57 which acts as a contactizer for guiding the insertion of a male pin. The tubularly shaped contact region 56 at the beads define a plane curved contact surface which surface may be in radial plane such as the axi-symmetrical contact surface 58 at a preselected point for axi-symmetrical contact surface 58 of the spring 34 is spaced within about 0.020 to 0.045 inches, and preferably about 0.035 inches maximum, from the free end 40 of the socket body when the spring contact is seated therewith, i.e., equals about 0.020" to 0.045" and preferably about 0.035" maximum. The distance from the free end 40 of the socket body to the axi-symmetrical contact surface 58 is designated by the letter "x" in FIG. 4. The above-described arrangement between the socket body and spring thus allows electrical contact to be made with a male contact close to the end 40 of the socket body. This advantageously provides electrical contact to be made immediately axially upon crimping a male contact (not shown) to the hoodless female contact 30, as required by the applicable rail specs.

The spring 34 may be of the seam type in which case it is made in a flat configuration, as illustrated in FIG. 5, and then roll formed into the form of a sleeve. A small gap 57 is located between the edges 51, as shown in FIG. 6A. This gap may visually disappear as a result of the roll formation and press fit steps. Alternatively, the spring 34 may be of the drawn type made, for example, by deep drawing process well known in the art, as shown in FIG. 6B.

While the fingers 50 described hereinabove provide good electrical continuity in a male terminal, increased electrical contact may be established by providing the contact region 56 with inwardly disposed dimples 62, as shown in FIG. 7. While the dimples could be disposed on the same radial plane, preferably the dimples 62 are staggered on the fingers 50, i.e., disposed at different axial distances from the free end of the socket body as shown more particularly in FIG. 5. This advantageously reduces the insertion force needed to insert a male pin between the fingers 50 than when the dimples 62 are all on the same radial plane, while increasing the retention force provided by the fingers 50. Additionally, by staggering the dimples 62, the resonance point of the individual fingers 50 will vary during vibration, thus mitigating open circuit faults. Fingers having different widths "W", as illustrated in FIG. 5, also aid in overcoming the resonance problem encountered with conventional spring contacts. The dimples 62 further assure that a gas-tight



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connection is established between the fingers and a male contact. Such a gas-tight connection seals out corrosive gases and thereby prevents formation of films or oxides on the surfaces interconnecting the mating male/female contacts that could degrade the electrical conductivity therebetween and cause failures in the connection. It should be noted that dimples or fingers having differing widths may not be necessary in many applications.

The spring 34 may be retained within the hole 38 of the socket body 32 by inserting the contact into the socket body with a press fit configuration and thereafter rolling the free end of the socket body radially inwardly to form an annular shoulder 53 which will engage and 35 of the spring in the event that a sufficient force is applied to the spring tending to pull the spring out of the socket body. See FIG. 8. Alternatively, or in addition thereto, the rear mounting portion 46 of the spring contact may have an annular groove 70 thereon, shown with more particularity in FIG. 8A. After assembly, the wall of the socket body 32 may be roll crimped such that a portion 59 of the socket body wall is rolled into the groove 70, as shown in FIG. 9. The rear mounting portion 46 of the spring 34 may have a variety of groove configurations, as shown with more particularity in FIGS. 8A-C.

Another means for retaining the spring in the socket body is shown in FIG. 10. In this embodiment, the rear mounting portion 46 of the spring has a plurality of outwardly extending spring retention bars 80. The bars 80 resiliently compress inward upon insertion of the spring 34 into the hole 38, but die into the inner wall 38 of the hole to resist removal. As further illustrated in FIG. 10, the pin portion 92 of a male contact 90 is inserted between fingers 50 which spread to resiliently grasp the pin portion 92 via the dimples 62. It should be noted that the dimples 62 are optional.

FIGS. 11-13 illustrate an attachment mechanism for electrically connecting the socket body 32 to an electrical conductor 102, such as a conventional insulated copper wire, for example. The socket body 32 includes a forward (first) tubular portion 32a and a rearward (second) tubular portion 32b separated by a solid center section 32c. The second or rearward portion 32c forms a wire receiving end 41 which opens to a rear hole or blind bore 39 which receives the copper strands 106 of insulated wire 102. The first or forward tubular portion 32a includes the male contact receiving blind bore 38 discussed previously. The front and rear bores 38 and 39 are closed by end walls 38a and 39a, respectively, formed by center section 32c of the socket body. The socket body 32 includes a pair of spaced radially extending shoulders 32d.

As is shown in FIG. 12, the wire strands 106 of the conductor 102 are inserted a predetermined distance into hole 39, which insertion may be aided by a small viewing hole 104 (shown in FIG. 13). The distal end wall 39a of the hole 39, in any event, limits the insertion distance of the wire. A selected portion 106 of the socket body 32, extending over the wire strands 106, is crimped onto the wire strands to make good electrical contact therewith and mechanically hold the wire strands 106 in the socket body 32, as shown in FIG. 13. Advantageously, the socket body while serving to hold and protect the spring also provides for direct attachment to conductor wires and the like without the need for additional parts. It should be noted that while it is preferable to provide separate front (first) and rear (second) bores 38 and 39, respectively, separated by a center section 32c of the socket body, the hole or bore could be continuous, i.e., one long bore.

There has thus been described an improved contact arrangement which can be most effectively manufactured on a

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repetitive basis. This spring is protected from damage by the socket body. The dimples, when utilized, provide an increased gas tight point(s) of contact, allowing thinner or less noble electrical conductive plating to be used on the fingers. Optionally, staggering the dimples reduces the overall mating and unmating force while maintaining a desired gas tight seal between the fingers and the male contact. Accordingly, various modifications of the hoodless socket, and processes involved in manufacturing the contact terminal, will occur to persons skilled in the art without involving any departure from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A two piece hoodless female contact for engaging a male pin comprising:

a socket body forming one piece of the contact, the socket body having a first tubular portion and a second portion extending along a longitudinal axis, the first portion having an axial hole therein defining an open free male contact receiving end, the second portion having an open wire-receiving end for connection with an electrical conductor; and

a separate spring forming another piece of the contact, the spring being located in the axial hole defining the male contact receiving end of the first tubular portion, the spring including a forward portion and rear portion, the forward portion having a plurality of forwardly and inwardly extending fingers which terminate near the free male contact receiving end of the first tubular portion for resiliently grasping a male pin in close proximity to the free male contact receiving end.

2. The contact defined in claim 1 wherein the socket body further includes a third portion in the form of a solid generally cylindrical section disposed between the first and second portions and wherein each of the fingers includes a male pin engaging surface and wherein the male pin engaging surfaces of the fingers are arranged to grasp the male pin at a distance along the longitudinal axis within a range of about 0.025 to 0.045 inches from the free male contact receiving end of the socket body.

3. The contact defined in claim 2 wherein each of the fingers has an outwardly and forwardly of the respective pin engaging surface thereof for facilitating insertion of the male pin in between the fingers.

4. The contact defined in claim 1 wherein each of the fingers has an inwardly disposed dimple which forms the pin engaging surface for engaging the male pin.

5. The contact defined in claim 4 wherein the dimples are staggered along the lengths of the individual fingers with the dimples being positioned at different axial distances from the free male contact receiving end of the first tubular portion of the socket body.

6. The contact defined in claim 1 wherein the first tubular portion of the socket body is crimped onto the rear portion of the spring.

7. The contact defined in claim 1 wherein the forward portion of the spring terminates axially inwardly of the free male contact receiving end of the first tubular portion of the socket body and wherein the free end of the first tubular portion of the socket body is rolled over to extend radially inwardly beyond the forward portion of the spring to prevent removal of the spring from the hole and to contact a mating pin contact.

8. A two piece female contact comprising:  
a cylindrically shaped socket body member formed as a single part comprising one piece of the contact, the socket body member having first and second tubular

# EXHIBIT 13

**Independent Claims of the '974 Patent**

<b><u>CLAIM ELEMENTS</u></b>	<b><u>HOW ELEMENT IS ABSENT FROM PRECI-DIP'S CONTACT</u></b>
<p>1. A <b>two piece hoodless</b> female contact for engaging a male pin comprising:</p>	<ul style="list-style-type: none"> <li>▪ The Preci-Dip Reversed Clip contact requires a hood in order to work. Therefore, it cannot be "hoodless."</li> <li>▪ The required hood of the Preci-Dip Reversed Clip contact is a third piece. Therefore, it cannot be a "two piece" contact.</li> </ul>
<p>a socket body forming one piece of the contact, the socket body having a first tubular portion and a second portion extending along a longitudinal axis, the first portion having an axial hole therein defining an open free male contact receiving end, the second portion having an open wire-receiving end for connection with an electrical conductor; and</p>	
<p>a separate spring forming another piece of the contact, the spring being located in the axial hole defining the male contact receiving end of the first tubular portion, the spring including a forward portion and rear portion, the forward portion having a plurality of forwardly and inwardly extending fingers <b><u>which terminate near the free</u></b> male contact receiving end of the first tubular portion for resiliently grasping a male pin in close proximity to the free male contact receiving end.</p>	<ul style="list-style-type: none"> <li>▪ While the Preci-Dip Reversed Clip contact does comprise a spring, the fingers of the Preci-Dip spring are not restricted by the tubular piece in which the spring sits; its ends are covered by the required hood. As such, the Preci-Dip Reversed Clip contact does not position its spring contact so that the forwardly and inwardly extending fingers terminate within the formed socket body, as required by a valid interpretation of the '974 claims.</li> </ul>



<p>8. A <u>two piece</u> female contact comprising:</p>	<ul style="list-style-type: none"> <li>▪ The Preci-Dip Reversed Clip contact requires a hood in order to work. Therefore, it cannot be “hoodless.” Moreover, the required hood of the Preci-Dip Reversed Clip contact constitutes a third piece. Therefore, it cannot be a “two piece” contact.</li> </ul>
<p>a cylindrically shaped socket body member formed as a single part comprising one piece of the contact, the socket body member having first and second tubular portions separated by a solid center portion extending along a longitudinal axis, the first tubular portion defining a first axially disposed blind bore with a free end for receiving a male contact, the second tubular portion defining a second axially disposed blind bore sized and shaped to receive an electrical conductor; and</p>	
<p>a separate male contact engaging spring forming another piece of the female contact, <b><u>the spring being seated entirely in the first bore,</u></b> the spring having front and rear portions, the front portion of the spring having a female coupling portion adjacent to the free end of the first tubular portion of the socket body member and the rear portion of the spring and the first tubular portion of the body member having cooperative securing means for securely holding the spring in fixed position within the body member.</p>	<ul style="list-style-type: none"> <li>▪ As stated above, the fingers of the Preci-Dip spring are not restricted by the tubular piece in which the spring sits; its ends are covered by the required hood. As such, the Preci-Dip Reversed Clip contact does not position its spring “entirely in the first bore,” as required by a valid interpretation of the ‘974 claims.</li> </ul>

<p>13. A male/female contact system for coupling a male pin contact to a female socket contact, comprising:</p>	<p>a male pin contact;</p>	<p>a female socket contact formed in <u>two separate pieces</u>, the first piece being in the form of a tubular socket member having a first blind bore therein with an open free end and having a second blind bore therein sized and shaped for receiving an electrical conductor, the tubular socket member consisting of a single part; and</p>	<p>the second piece of the female socket contact being a spring member in the form of a sleeve seated in the <u>first blind bore of the tubular socket member</u> and establishing a press fit therein to prevent movement of the spring member relative to the tubular socket member, <u>the spring member having a forwardly extending female coupling portion terminating adjacent the open free end of the first blind bore</u>, said male pin contact being inserted into the open free end and grasped by the female coupling portion.</p>
		<ul style="list-style-type: none"> <li>Claim 13 simply adds the use of the male pin contact to the two-piece contact described in claims 1 and 8. As with both of the above claims, this claim should be viewed to comprise, by necessity, a hoodless, two-piece socket. For the reasons set forth, this requirement is absent from Preci-Dip's product.</li> </ul>	<ul style="list-style-type: none"> <li>These requirements state that the spring member be seated in the first blind bore so that the forwardly extending coupling portion terminate adjacent to the open free end. As stated above, these requirements are absent from Preci-Dip's products.</li> </ul>

<p>17. A method for making a <u>two piece</u> female socket contact comprising the steps of:</p>	<ul style="list-style-type: none"> <li>Once again, the Preci-Dip Reversed Clip contact requires a hood in order to work. Therefore, it cannot be "hoodless." Moreover, the required hood of the Preci-Dip Reversed Clip contact constitutes a third piece. Therefore, it cannot be a "two piece" contact.</li> </ul>
<p>forming a sleeve spring member having a rear end and a female coupling portion at a forward end;</p>	
<p>forming a separate one piece socket body having first and second tubular portions separated by a solid center section, each of the first and second portions having a wall surrounding a blind bore therein, the blind bore in the first tubular portion having a free open end for receiving the spring member and the blind bore in the second tubular portion adapted to receive a conductor;</p>	
<p><u>inserting the spring member entirely within the blind bore in the first tubular portion</u> of the socket body to form a press fit with the female coupling portion being positioned adjacent to the free open end of the blind bore in the first tubular portion;</p>	<ul style="list-style-type: none"> <li>As stated above, the fingers of the Preci-Dip spring are not restricted by the tubular piece in which the spring sits; its ends are covered by the required hood. As such, the Preci-Dip Reversed Clip contact does not position its spring "entirely in the first bore," as required by a valid interpretation of the '974 claims.</li> </ul>
<p>providing an electrical conductor; and</p>	
<p>inserting the electrical conductor into the blind bore in the second tubular portion and crimping the wall of the second tubular portion onto the electrical conductor.</p>	